American Aviation

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SEPT. 13

1954

Interview with Hydro-Aire's Rhoads: Where the Accessories Industry Is Headed 38

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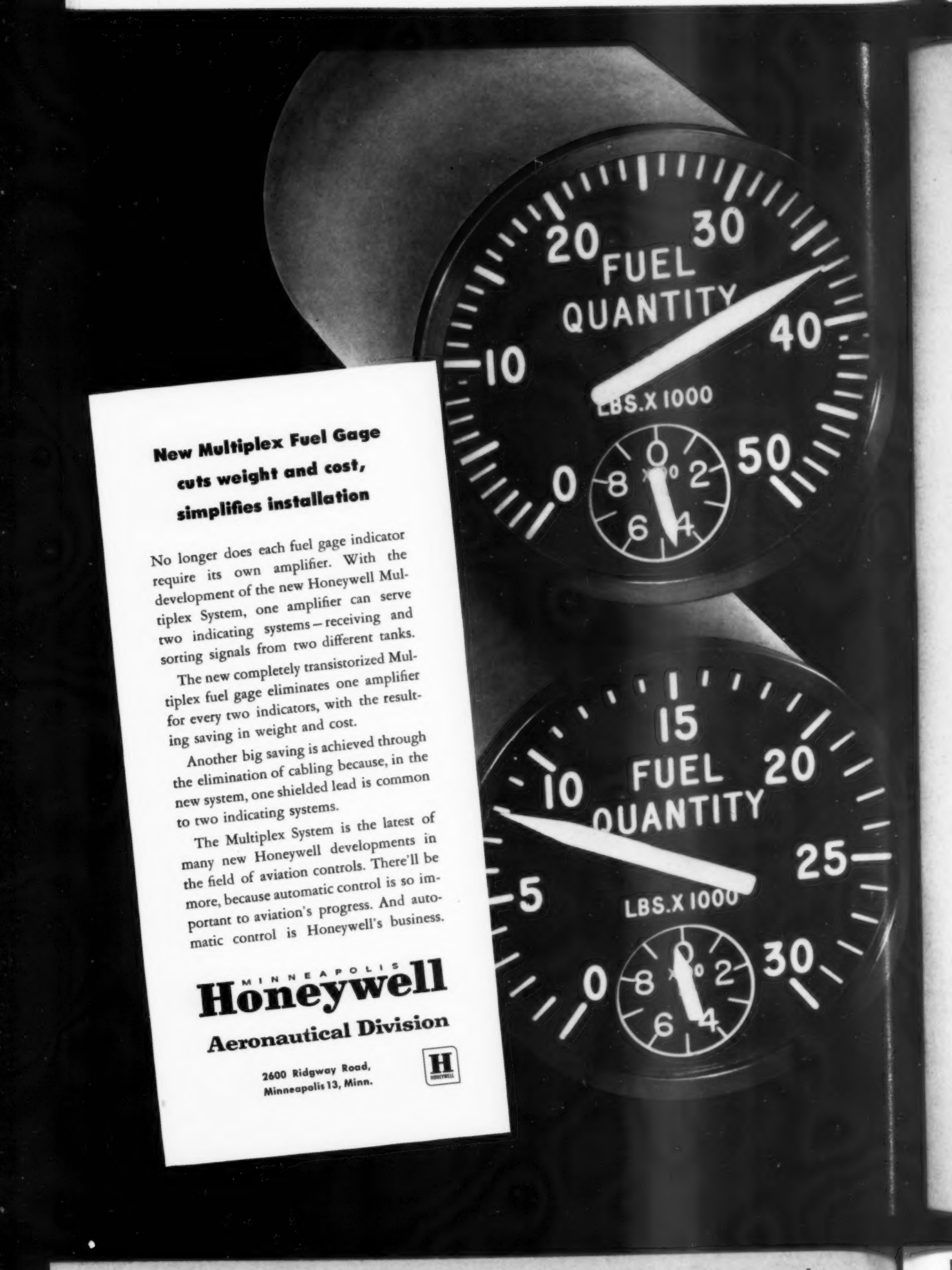

New Multiplex Fuel Gage cuts weight and cost, simplifies installation

No longer does each fuel gage indicator require its own amplifier. With the development of the new Honeywell Multiplex System, one amplifier can serve two indicating systems—receiving and sorting signals from two different tanks.

The new completely transistorized Multiplex fuel gage eliminates one amplifier for every two indicators, with the resulting saving in weight and cost.

Another big saving is achieved through the elimination of cabling because, in the new system, one shielded lead is common to two indicating systems.

The Multiplex System is the latest of many new Honeywell developments in the field of aviation controls. There'll be more, because automatic control is so important to aviation's progress. And automatic control is Honeywell's business.

MINNEAPOLIS
Honeywell

Aeronautical Division

2600 Ridgway Road,
Minneapolis 13, Minn.

AIRTRENDS

Washington, D. C., Sept. 13, 1954

AIRBORNE RADAR shows signs of hurdling the high barrier between military use and civil service tests to widescale acceptance in commercial air transports. Most promising development is United Air Lines' vote of $4 million for fleet-wide use of C-band weather-mapping radar.

Increased safety is bound to be attained. There have been many airline accidents which airborne radar could have prevented—i.e., National Airlines over the Gulf of Mexico and Braniff's Mason City, Ia., accident ending that lines' 14-year safety record.

TECHNICAL BATTLE over relative merits of C-band (5.7 centimeter) vs. X-band (3 cm) has deteriorated to competitive matter to be determined by individual users. Both RCA with C-band radar, the type specified by UAL, and Bendix Radio with X-band are pushing production to meet equipment demand for further airline tests.

Pilot demand for accelerated radar usage is no small factor in recent developments.

Next big issue: Once airline service experience is gained with airborne radar, will it become a mandatory requirement?

CAB/CAA REORGANIZATION plan proposed by the Investment Bankers Association is getting top level attention in the White House. Plan calls for reviving Civil Aeronautics Authority with the Secretary of Commerce as its Chairman, giving aviation a voice on the Cabinet level. CAB would remain independent, CAA would become Civil Aeronautics Technical Administration, and new office of Civil Air Contracts Administrator would be established.

Earliest date for action on reorganization would be year end.

FIRST CLASS MAIL will continue to move via domestic trunklines between Chicago and New York/Washington beyond the Sept. 30 deadline unless the Post Office bows to stiff pressure being applied by the railroads. New York-Florida market, however, may face airline opposition to further extension with main objection low first class mail traffic combined with low rates.

International mail picture looks brighter with new U. S.-Swiss agreement setting pattern of reciprocity assuring foreign carriers getting their share of U. S. mail in exchange for U. S. carriers getting some of theirs.

Our international carriers, prior to Post Office economizing, got more mail from foreign countries than we gave foreign carriers. Reciprocity prevents foreign countries, irked by present U. S. policy of using U. S. carriers with rates much lower than UPU rates, depriving U. S. lines of mail.

LATEST SALES PITCH for overwater transport models is aimed at Europe-U.S. non-stop operation on winter schedules.

Almost simultaneous with Douglas Aircraft's announcement of the long-range DC-7, designed for such operation, Pan American World Airways is set to unveil a modified version of its Boeing Stratocruiser capable of non-stop operation on 85% of the winter flights.

NEWS at DEADLINE

5000-Mile DC-7C's

Douglas Aircraft Co. has started production on a long-range version of the DC-7, to be known as the DC-7C—or the Seven Seas. New plane has a range of more than 5000 miles and will fly westbound from Europe to New York with full payload under adverse winter wind conditions. It will enable trans-Atlantic carriers to cut from 3 to 5 hours from westbound schedules and from 1½ to 3 hours off eastbound trips. It will cruise at 350 mph with full payload, according to Douglas.

With a wingspan of 127'-6", fuselage length of 112'-3", and vertical tail height of 30'-7", it is larger than earlier DC-7's by 10' in span, 3' in length, and 2' in height.

Increased span, added to the center wing section, permits an increase in fuel capacity from 6400 gallons in the DC-7B to 7860 gallons, while moving engines five feet further from fuselage cuts cabin noise level.

Powered by an advanced version of Wright turbocompound engine, developing 100 hp per engine more for climb, the DC-7C is designed for 140,000-lb. take-off weight and 107,000-lb. landing weight. In deluxe version it will carry 62 passengers. Plane will fly non-stop over such routes as Stockholm-New York (3970 miles), New York-Rome (4205 miles), Frankfurt-New York (3845 miles), and Tokyo-Seattle (4793 miles).

Pan American World Airways has ordered 15 of these aircraft, with the first six scheduled for delivery by June of 1956.

Records Fall at Dayton

Dayton, Ohio—A record crowd of over 202,000 watched two speed records broken during the three-day National Aircraft Show held here over Labor Day weekend. Results of the four trophy races were as follows:

General Electric Trophy was won by Major John Armstrong, Wright-Patterson AFB, who set a new world record flying an F-86H Sabrejet over a 500-kilometer course. He averaged 649.302 mph, bettering the previous world mark of 607.1 mph. (Major Armstrong was killed in a crash three days later while preparing to break his own mark in a re-run of the trophy event for the benefit of spectators.)

Thompson Trophy was won by Captain Eugene P. Sonnenberg of Eglin AFB, who established a new Thompson Trophy record of 692.823 mph over the 100-kilometer closed course flying a North American F-86H Sabrejet. Sonnenberg's mileage could not be officially recognized as a new world record because his speed did not exceed the previous record of 691.1 mph by the required one percent.

Bendix Trophy winners also established a new event record. Winner was Capt. Edward D. Kenny of the Air Training Command, whose Republic F84F Thunderstreak flew the 1900-mile distance in 3:01:56, averaging 616.208 mph. The two runners-up averaged 607.164 and 606.846 mph, all three bettering the record of 603.547 mph established a year ago.

Allison Trophy, a new racing event, was won by 2nd Lieut. William J. Wright of ADC, who piloted a Northrop F-89 Scorpion to 10,000 feet altitude in 2.07 minutes.

Site of next year's show will probably be in the Fort Worth-Dallas area or in the east. It definitely will not be held at Dayton.

Patent Suit Ended

Settlement of two-year-old patent suit filed by Pacific Airmotive against The Garrett Corp., Boeing, and later Douglas has resulted in Douglas licensing of PAC to build and sell cabin pressure regulators coming under its patents. PAC was also granted a sub-license from Garrett to produce similar equipment, with royalties going to Boeing. Under the sub-license, manufacture and sale of Boeing patented equipment is restricted to sale of regulators for military aircraft only.

Ercoupe Rights Sold

Manufacturing rights for production of Ercoupe parts have been sold by Sanders Aviation Co., Riverdale, Md. to Vest Aircraft Co. of Denver. Earlier this year Vest also purchased similar rights to the two-passenger Swift from Temco.

Midge at Farnborough

Farnborough, England — The only completely new aircraft shown at this year's SBAC Show is the Folland Midge lightweight fighter. For the first time, visitors are allowed to inspect the Hunter, Swift, Vulcan, and Valiant at close quarters.

Armstrong-Whitworth hypothetical supersonic model confirms current British belief in the crescent wing. A Handley-Page model reveals that the crescent wing is aeroisoclinic—it bends without tip incidence loss and is therefore the answer to turn-tightening of high-speed swept airplanes. British Mach 2 airfoils are double-wedge with parallel midsections.

A Super Sprite parachute rocket pack of exact size and shape to fit the Valiant 2 nacelles are shown by de Havilland. The Super Sprite gives 20% less take-off run or provides 10% overload. Diagrams of a Super Sprite with the gyron epitomizes British belief in rocket-jet combination for high-speed supersonic interceptors.

British VTO Flies

London—A wingless vertical take-off aircraft has been tested in Britain, it was revealed in London prior to opening of the Farnborough Show. Developed by Rolls-Royce, the 3½-ton aircraft reflects the British trend toward planes rising vertically from the normal horizontal position. During its test flight a few weeks ago, the plane remained airborne under complete control for 10 minutes.

Little more than an engine with a pilot mounted on top, the plane employed downward-facing jet-streams whose direction can be varied to control the angle of climb. The jet streams can be provided either by small subsidiary engines or by deflection of the jet stream of the aircraft's main powerplant.

Big Contract to Seaboard

Seaboard & Western Airlines has been awarded a six-month $3 million contract from the Defense Department for hauling of military freight and personnel plus dependents between the U. S. and Western Europe military installations. Carrier will use new Super Constellations in the operation, which becomes effective October 1.

The Most Trusted Name in Ignition

First choice for light plane ignition

Over the years, Bendix ignition has been the choice of leading engine manufacturers and plane builders in the light plane field.

For example, Bendix magnetos are widely used by such outstanding engine builders as Continental, Aircooled and Lycoming, and are found on such popular types of planes as Beech Bonanza and Twin-Bonanza, Cessna 170, 180, and 310, Aero-Commander, Grumman Widgeon, Piper 135 Pacer, Tri-Pacer, and Apache, Riley Twin-Navion, and Ryan Super-Navion.

There is good reason for this widespread acceptance in the light plane field. Long experience in all phases of aviation has enabled Bendix to design magnetos incorporating every desirable feature of performance at prices compatible with light plane manufacturing requirements.

Again the ingenuity and facilities of the Scintilla Division demonstrate just why Bendix is The Most Trusted Name in Ignition.

S-50 SERIES

S-20 SERIES

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of Bendix
AVIATION CORPORATION
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Letters

Letters should be addressed to The Editor, AMERICAN AVIATION *Magazine, 1025 Vermont Ave., N. W., Washington 5, D. C. Anonymous letters will not be printed, but names will be withheld upon request.*

Factual Story

To the Editor:

Needless to say, all of us at Cessna were certainly more than pleased with the story which you carried on Cessna in the August 16 issue. Actually, it was one of the most factual stories that I have seen written on our company in a long time. Thanks from all of us for a job which we really appreciated.

BOB CHATLEY, Director
Sales Promotion & Advertising
Cessna Aircraft Company
Wichita, Kansas

Unbiased News

To the Editor:

I cannot tell you how much my subscription to AMERICAN AVIATION means to me. I am now chief pilot of Walston Aircraft, East St. Louis, Illinois. Your magazine keeps me completely abreast of all phases of aviation. Besides being the world's largest distributor of Cessna Aircraft, we have three subsidiaries that hold Irregular Carrier certificates and approved Flight School Agency certificates. So you can see how AA keeps me in the "know" in aviation. Keep up this wonderful *unbiased* source of continued trustworthy news in our business.

MERWIN S. WILLIAMS, JR.
Walston Aircraft
East St. Louis, Ill.

Helicopter Records

To the Editor:

We were rather surprised at the article on page 18 of your August 16, 1954, issue entitled "Helicopter Time Record Set by H. A. S." A quick check through our flight records on the Alaska survey projects with the U. S. Army Engineers revealed the following times:

Date	Time	Heli-copter	Pilot
7/21/52	14:40	N181B	Davidson
7/25/52	12:50	N181B	Davidson
6/ 2/53	12:10	N181B	Winchester
7/ 1/53	12:10	N181B	Winchester

These are not necessarily the highest daily times flown on the Alaska projects in spite of the usual Alaska weather and field maintenance and operating conditions.

ROBERT H. FACER
Manager
Kern-Copters, Inc.
Box 186, Station B
Bakersfield, Calif.

Could Be Magnetic Pole

To the Editor:

I have been interested in the recent exchange of letters with regard to the photograph of the North Pole which formed part of the Champion Spark Plug advertisement in AMERICAN AVIA-

when is an airplane great?

...When its performance characteristics solve critical operational needs.
...When its versatility permits a wide range of functions.
...When a strong growth potential is inherent in its basic design.
...When it is a "pilot's airplane", essentially simple and easy to fly.
...And finally when it's out of engineering and in the air—when it's being delivered and in operation.

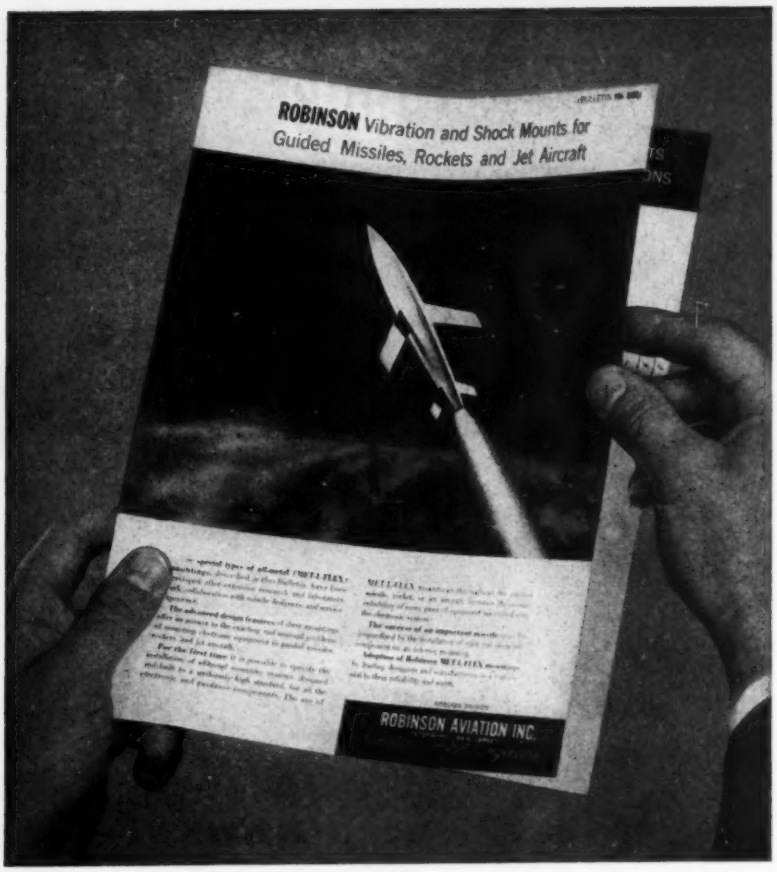
The Martin B-57—brilliant new member of the Air Force's family—is in truth a great airplane. Low wing loading gives it take off and high altitude performance characteristics exceptional in the reconnaissance bomber class, and the Martin rotary bomb door makes it capable of both high and low-level bombing runs at fighter speed.

Basic configuration changes now make possible adaptions of the USAF B-57 to cover a wide variety of critical missions.

But for the final word on this remarkably versatile airplane—ask the man who has flown one.

You will hear more about Martin!

MARTIN
BALTIMORE · MARYLAND



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...a new concept of

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Exclusive Robinson all-metal designs provide damping four times better than conventional mounts employing rubber, organic or synthetic materials. *This high damping results in utmost stability assuring greater reliability of the mounted equipment.*

Yours for the asking, the new booklet (No. 800) offers the answers to many exacting and unusual problems of mounting electronic equipment in supersonic aircraft and missiles.

The booklet includes engineering data and specific examples of various types of mounts and engineered mounting systems currently being applied and used in important missile projects. Send for your FREE copy today.

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Whether your problem involves precision instruments, electronic equipment, aircraft, motor vehicles, home appliances or industrial machinery, we will tackle it with the same engineering know-how and skill that has marked Robinson as leaders in the field of airborne vibration and shock control. Write or wire, stating your problem. Dept. AV.

ROBINSON AVIATION INC.
TETERBORO, NEW JERSEY
Vibration Control Engineers

TION, issue of June 21st. There is a possibility that both parties might be correct.

In explanation, I would point out that there are two North Poles—the true North Pole and the magnetic North Pole. The picture from the Champion advertisement is obviously not the true North Pole. There is, however, a chance that it could be the magnetic North Pole.

I note your statement that Colonel Balchen has identified it as a portion of the south shore of Devon Island. This could very well be true although there does not seem to be quite enough shown in the picture to make identification absolutely certain. I traveled one summer in that part of the country and insofar as the picture goes, it could also be a portion of Ellesmere Island or a portion of several other smaller islands in that vicinity. The magnetic pole lies near the Boothia Peninsula and while I have not been exactly at that spot, I would not be surprised to find the coastline somewhat similiar to that shown in the original photograph.

There has been considerable flying over both Poles and it may well be that someone can give us the answer as to whether it could or could not be the magnetic North Pole. There is one point, however, of difference between them. The true North Pole is a fixed point while the magnetic North Pole may shift locations to some extent. I would be interested to hear if the Air Force has an answer.

ALLEN F. SHERZER
1213 Ferdon Rd.
Ann Arbor, Mich.

Timely Recognition

To the Editor:

I have just read your very fine article on the Army aircraft question as well as your comments on Bill Bunker. Needless to say your recognition of the problem, and of Bill Bunker's efforts, is most timely. Congratulations.

STANLEY HILLER, JR.
President
Hiller Helicopters
Palo Alto, Calif.

Concur . . . plus

To the Editor:

In your editorial page in the August 30 issue you pay high tribute to Senator Pat McCarran for "his tireless efforts on behalf of civil aviation." I concur with your splendid thoughts except I would have left out the word "civil."

Many years ago I had occasion to know Senator McCarran slightly. Those were in the days when we were trying to get recognition of the need for a military Air Force for our nation. I found him, then, most interested in aviation—military aviation—and eager to help. I consider him a great asset to America.

MAJOR GENERAL
Air Force Retired

INDIVIDUAL SEATING in the new AERO Commander 560

Reclining individual chairs adjust fore and aft providing maximum personal comfort for the occupant.

Individual Seating

is one of the many comfort advantages in the new Aero Commander 560.

Each of the six passengers enjoys by-the-window seating, while a center aisle permits passengers to move about during flight in this 5-7 place twin-engine executive airplane.

WRITE DEPT. 129 FOR NEW CATALOGUE

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ARC #16706

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Aircraft Radio Corporation

BOONTON • NEW JERSEY

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For Airborne Reception of

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- **Visual-Aural Ranges • Runway Localizers • GCA Voice**
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B-13 Converter, E-14 Rack and M-10 Mounting

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A-13B Antenna

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American Aviation Directory: Twice-yearly listing of products, people, and organizations. $7.50 each. Managing Editor—Marion E. Grambow.

Official Airline Guide: Monthly publication of airline schedules and fares. $13.50 per year in USA; $14.00 in Canada; $15.00 elsewhere. Published from 139 N. Clark St., Chicago 2, Ill. Phone: Central 6-5804. Managing Editor—Robert Parrish.

Air Traffic News (Incorporating Air Traffic Reports): Daily rates and tariff news. $175 per year. Managing Editor—Wallace I. Longstreth.

Airports: Weekly newsletter for airport officials, suppliers, and services. Airmailed every Friday. $25 per year. Managing Editor—Lois C. Philmus.

Air Information Division: 595 Broad Avenue, Ridgefield, N. J. Phone: Morsemere 6-8850. Director—Edward H. Henkler.

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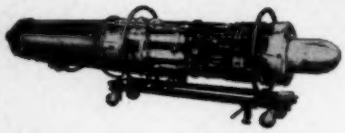

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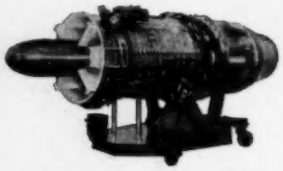

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WESTINGHOUSE

A. V. ROE

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the greatest names in jets test with

GREER

the greatest name in test equipment

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These words will tell you, as no advertisement can, that Greer has succeeded in its goal – to take the guesswork out of aircraft testing operations. Today, with Greer, testing is simple, rapid, dependable, absolutely accurate.

Greer's standard testing equipment fills the pages of a 26-page catalog (write for it on your letterhead). To meet unusual testing requirements, many special machines have been designed – and a staff of top engineers in the field is available for discussions of out-of-ordinary problems. Please write or call without obligation.

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Field offices in Chicago, Dayton and Detroit • Sales Representatives in all principal cities

Sept. 13, 1954 - Vol. 18 No. 8

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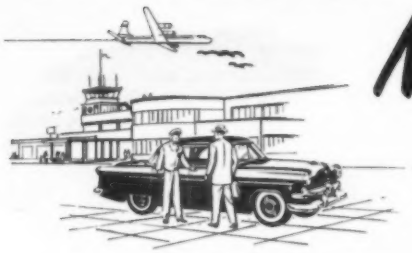

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Why Hertz brings more revenue to your airline

1. Hertz originated the Plane-Auto Plan. Many people who normally drove from city to city—mainly because they needed a car at their destination—now take a plane for speed and comfort . . . because they know they can rent a car from Hertz on arrival.
2. Only Hertz assures them of a car wherever they go . . . because only Hertz serves more airports and more cities throughout the world.
3. Hertz spends nearly $1,000,000 a year in advertising the Plane-Auto Plan in national magazines. No other rent-a-car company even approaches this figure!

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FUTURE PILOT. Aero Tech student smiles after successful "blind flight" in Link Trainer. Many graduates are now airline captains and maintenance supervisors.

If it involves an airplane, East Coast Aviation has probably done it. Located at Bedford (Boston) Airport in Massachusetts, this unusual firm services resident and transient aircraft, operates the famous East Coast Aero Tech training school for pilots and mechanics, and participates in missions ranging from pest control to air-sea rescue. No doubt about it—East Coast planes get a work-out!

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Pulse of the Industry

(With this issue AMERICAN AVIATION begins a series of simple graphs along with suitable commentary designed to keep the reader abreast of broad industry trends. Frequency of each chart or set of charts is dictated by normal rate of change in that particular field.)

USAF and Navy Obligations & Spending for Aircraft

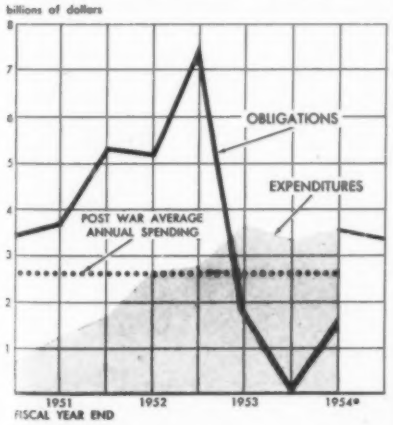
In the charts below, the rates of obligation indicate the pace at which the military services are completing contracts with the industry for continued production of existing types or new-type aircraft. As aircraft are built, industry is paid varying amounts in the form of progress payments to offset major expenditures which are readily accountable. These payments, plus final payments on acceptance of an aircraft, represent "expenditures" of money.

The sharp dip in obligations by both the USAF and Navy in fiscal 1953 represents the leveling-off in new aircraft requirements to meet established goals. Note that expenditures have been on the increase as the industry delivers planes contracted for in earlier periods.

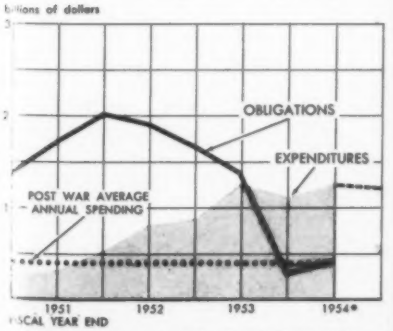
Reduction in obligations and increased expenditures represent a reduction in industry backlogs. These backlogs will continue to decrease for some time, balanced somewhat by limited orders for new aircraft.

These charts will be brought up-to-date semi-annually.

USAF—6-Month Obligations & Spending



NAVY—6-Month Obligations & Spending



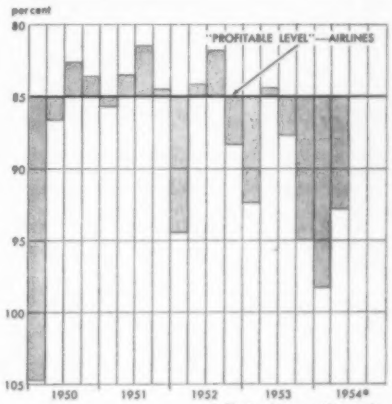
* Broken lines are estimates for 1st half of fiscal 1955.

Operating Ratio—Airlines

Operating ratio, the ratio of operating expenses to operating revenues, before taxes, is considered one of the best yardsticks of an industry's financial health. Many airlines favor it rather than rate of return, used by CAB, in determining allowable mail pay.

A large group of domestic airlines has applied to CAB asking that in rate-making cases the maximum operating ratio be established as 85%. More than 85% indicates an unhealthy ratio, lower percentages a rosy picture.

The bar graph at right shows the relatively weak financial position in which the airlines now find themselves and represents the reasoning behind industry efforts to raise revenues. This chart will appear quarterly.



* First six months only.

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Personal View

By WAYNE W. PARRISH

Coming Into Focus

At last there are signs of some tangible progress being made in this country in the turboprop engine field.

The Lockheed YC-103, powered with Allison YT56 engines, has made its first flight. The Convair Turboliner has continued its flight demonstrations. And just lately a Lockheed Super Constellation, the R7V-2, equipped with Pratt & Whitney T34's, made its first test hop.

But there is more in the offing. Arthur E. Raymond, v.p.-engineering of Douglas Aircraft, has just stated in a speech for the first time that Douglas will probably bring out a DC-7 version equipped with turboprops when a suitable engine is fully developed. And Lt. General Joseph Smith, Commander of the Military Air Transport Service, gave considerable emphasis in a recent speech to MATS' need of a turboprop transport for cargo carrying. Allison says it can have its new T56 engine ready for commercial use in 1957.

While the U. S. has made tremendous strides in the turbine power field, we have lagged behind in the harnessing of this new jet power to propellers. The considerable commercial flying experience of the British Vickers Viscount is only too well known. Principal reason for lagging on this side of the Atlantic is due to the earlier lack of military interest, but the attitude of the services began changing last year with a new Pentagon command taking a new look at what was going on.

There are signs, in fact, of a final awakening in military circles to the entire airlift problem, of which turboprop is certainly one of the most important elements. How the military can consider that they have been preparing for all contingencies with scarcely any airlift for personnel and supplies has been one of the major mysteries of our times.

It has taken Allison Division of General Motors a long time to "get cracking," not altogether, by any means, due to its own lack of initiative, but the show seems now to be on the road. The potential of turboprop is unquestioned both for military and commercial use. Let's not let the new program get bogged down.

NWA'S Wise Choice

Election of Donald W. Nyrop as president of Northwest Airlines is one of the most encouraging events within the air transport industry in some years. For Northwest it is the fulfillment of a real need. For Nyrop, at 42, it is the beginning of what promises to be long career as one of the few new "second generation" airline executives.

We say this on the assumption that the Northwest board of directors will fulfill their agreement to give Nyrop a free hand with wide authority for a period sufficiently long to solve the airline's most pressing problems. The infighting within and the meddling by financial interests which have plagued Northwest in recent years must cease if Northwest's stature as a major airline is to be regained. A firm hand can do the job.

The Nyrop selection looks like a good deal all the way around for stockholders, employees, and the industry as a whole.

The Cochran Story

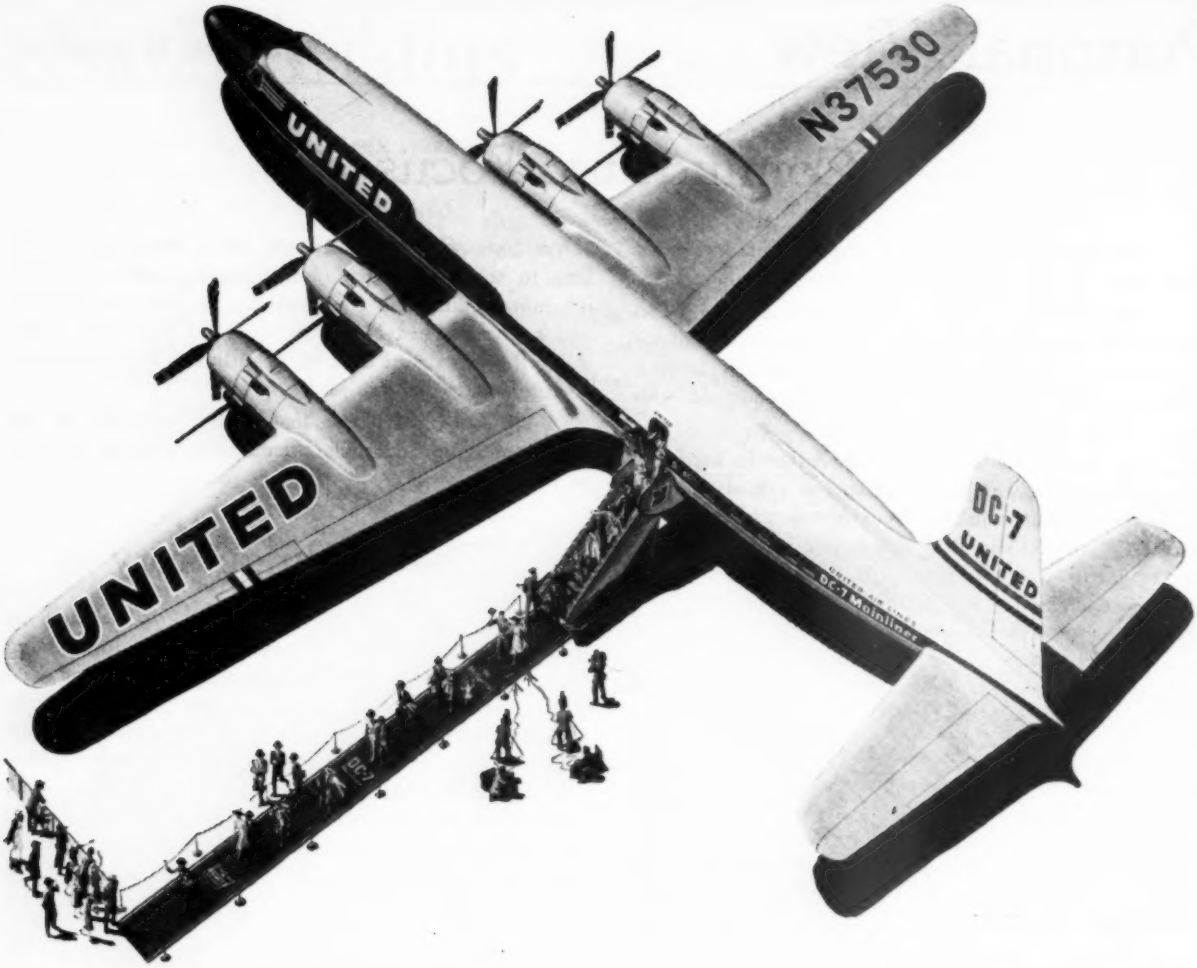
If the article in the August 16 *Life* magazine by Jacqueline Cochran is a fair sample of her forthcoming book, "The Stars at Noon," a new high in interesting aviation literature is about to be reached. For poignancy, frankness, and human ambition against staggering odds, the *Life* article rates a four-star billing. It leads to a better understanding of the self-made Jackie, who has won so many laurels in flying and in the business world. Quite apart from the aviation angles, the Cochran story is an example of what can and does happen in this land of opportunity.

The Locals are Potent

Although the local air carriers lost their legislative battle for permanent route certificates in the final days of Congress, we think they achieved a moral victory which may be preferable in the long run to actual legislative enactment.

What they achieved, first, was a demonstration of grass roots political strength which was breathtaking to an aviation industry which has not been very adept or effective heretofore in capitalizing on hometown support. Second, the carriers have succeeded in putting over a convincing argument to the CAB that three-year certificates are ridiculously short for financial stability.

This idea may not be popular with the local carriers but we don't believe that permanency of route certificates by Congressional legislative action is a sound solution to their problems. The CAB already has the power. But we do not believe, either, that a sound network of local systems can be constructed on the basis of precarious short-term franchises. We think CAB was sufficiently jolted so that it will use a more sensible long-range approach to local carrier problems. If it does, the superb demonstration of political strength engineered by the local carriers through their Washington counsel, Donald W. Nyrop, will not have been in vain.



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Also—your luggage gets "white glove treatment." It's stowed in a special compartment (exclusive with United) adjoining the main cabin for extra-fast delivery upon arrival. For reservations, call or write United or an Authorized Travel Agent.

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UNITED'S DC-7s NOW OFFER the fastest—the only nonstop flights, San Francisco-New York; and nonstop service Los Angeles-New York, Chicago-New York, Chicago-Los Angeles, Chicago-San Francisco, Chicago-Washington.

Copr. 1954, United Air Lines

When & Where

Sept. 13-24—Instrument Society of America, First Int'l Instrument Congress & Exposition, and 9th Nat'l Instrument Conference & Exhibit, Philadelphia.

Sept. 14-15—ATA standard practices committee mtg., Denver.

Sept. 17-18—Institute of Radio Engineers conference on communications, Cedar Rapids, Ia.

Sept. 21-23—ATA meteorological committee mtg., Tumbling River Ranch, Denver.

Sept. 21-23—ATA ticketing and baggage committee mtg., Mont Gabriel Club, Mont Gabriel, Quebec.

Sept. 22-24—American Rocket Society mtg., El Paso-White Sands Proving Grounds, N. M.

Sept. 22-25—Nat'l Assn. of State Aviation Officials, annual mtg., New Washington Hotel, Seattle.

Sept. 30-Oct. 1—Radio Technical Commission for Aeronautics fall assembly, Washington, D. C.

Oct. 5-6—ATA reservation committee mtg., Minneapolis.

Oct. 5-7—Champion Spark Plug Co. 10th annual spark plug and ignition conference, Hotel Secor, Toledo, O.

Oct. 5-9—SAE aeronautic mtg. and display, Hotel Statler, Los Angeles.

Oct. 11-12—AIA national aircraft standards committee, symposium on titanium standard parts, Cleveland.

Oct. 11-15—American Institute of Electrical Engineers fall mtg., Morrison Hotel, Chicago.

Oct. 12-13—ATA annual engineering and maintenance conference, San Francisco.

Oct. 18-22—National Safety Council, mtg. of aeronautical section, Conrad Hilton Hotel, Chicago.

Oct. 27-29—National Business Aircraft Assn. mtg., Hotel Adolphus, Dallas, Tex.

Nov. 8-9—National Air Taxi Conference, annual mtg., Biltmore Terrace Hotel, Miami Beach, Fla.

Nov. 8-10—National Aviation Trades Assn. annual convention, Biltmore Terrace Hotel, Miami Beach, Fla.

Nov. 9-12—Air Line Pilots Assn. convention, Chicago.

Nov. 14-17—Aviation Distributors and Manufacturers Assn., 12th annual mtg., Mayflower Hotel, Washington, D. C.

Nov. 17-19.—Calif. Assn. of Airport Executives mtg., San Jose, Calif.

INTERNATIONAL

Sept. 13-17—IATA, 10th annual mtg., Paris.

Sept. 17—IATA executive committee mtg., Paris.

Sept. 19-21—Int'l Northwest Aviation Council 18th annual convention, Hotel Vancouver, Vancouver, British Columbia.

Sept. 20-29—Federation Aeronautique Internationale general meeting, Istanbul, Turkey.

Sept. 28—IATA traffic conferences, Venice, Italy.

Oct. 5—ICAO, air navigation mtg. for the North Atlantic region, Montreal.

Oct. 14-15—Joint mtg. of Canadian Aeronautical Institute and the Institute of the Aeronautical Sciences, Montreal.

Industry Spotlight

• U. S. Air Force has finally made its move toward use of one-time, throwaway-type piston-engine spark plugs. Manufacturers estimate that as much as 20 cents per plug can be cut from the present price of about $1.40 by "deglamorizing" current models, without affecting performance.

• Custer Channel Wing-5, being flight tested at Oxnard, Calif., has actually maintained flight at speeds down to 11 miles per hour, according to Custer Channel Wing Corp., Hagerstown, Md. This is a record for "conventional" aircraft, if the Custer plane can be considered conventional. Plane also reached a 3000 ft.-per-minute rate-of-climb.

• Douglas A3D, first production-line model of the twin-jet bomber, flew from Edwards AFB to Norfolk, Va., non-stop in 4 hours 40 minutes for an average speed of 510 mph. Plane was enroute to Norfolk for special modification. Piloted by crew of three commanded by Comdr. H. J. Badger, the plane cruised at Mach 0.82 to 0.85 at 40,000 feet altitude.

• CAA has installed a pre-production version of Melpar, Inc.'s improved visual-aural omnirange (VAOR) at the Tilden, Ind., VOR, operating at 115.7 megacycles. VAOR, which gives the pilot voice-bearing information by which to make in-flight check on his airborne VOR equipment, will be operated on test for about two weeks.

• A new turboprop engine specification recently circulated to the engine manufacturers by the Air Materiel Command contains almost 150 changes in overall requirements and includes a section which would place responsibility for propeller availability and performance on them, even when the propeller contract has been placed elsewhere.

• Additional compounding of the Sikorsky S-56 helicopter is being studied by the manufacturer, including the possibility of adding wings outboard of the engine nacelles and possibly providing conventional propellers.

• Handley Page, which is making a serious bid to capture the DC-3 replacement market with its four-engine HPR3 Herald, claims 200 mile-per-hour cruise speed at 50% METO power; 1.675¢ per passenger-mile; 15.83¢ per short ton-mile.

• New plan, formulated by Rear Admiral Apollo Soucek, will be used in the 30-day shakedown of the first four Lockheed P2V-7's at Patuxent, Md., this month. Each plane will undergo different type test with one for regular service test, second for flight characteristics, third for electronics, and fourth for armament. Qualification tests will precede board of inspection trials.

• CAA has given impetus to development and use of engine vibration monitors by urging Boeing 377 operators to evaluate and possibly adopt them to determine engine roughness indicating incipient prop-blade failure. Prototype monitors of this type are reportedly under development by Hamilton Standard, Land-Air, Inc., Pan American World Airways, and Sperry Gyroscope Co.

• New method of titanium production will be tested at the U. S.-owned idle magnesium plant at Manteca, Calif., by Western Pyromet Co. Experiment in the General Services plant will last about one year.

• Breguet 940 convertiplane transport (AMERICAN AVIATION, *March 15*) is no pipedream. The French company has now received an order for the design's high-lift wing complete with four Turbomeca turboprops with large diameter props. It will be shown at next summer's Paris air show.

• First supersonic flight by a water-based aircraft (flying-boat to old hands) was made on August 3 when the Convair YF2Y-1 delta wing Sea Dart flew in excess of Mach 1 during a shallow dive from 34,000 feet over San Diego Bay. Plane which made the historic flight was the second prototype. The XF2Y-1, powered by two Westinghouse J34 engines, first flew in April 1953.

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

Light shoe gives fighter more kick

REPUBLIC'S RF-84-F Thunderstreak is equipped with B. F. Goodrich brakes . . . brakes made lighter to help save weight for the supersonic fighter's guns and cameras.

A new kind of brake shoe assembly uses a light magnesium shoe with a bonded lining. This eliminates rivets, permits use of a lighter weight lining that can be worn down a greater percentage of its full thickness. The shoe is operated by a narrow cavity expander tube that gives high braking pressure with less fluid, and, of course, *less* weight. And because the pressure is applied outward to the brake lining without need for complicated parts, still more weight is saved.

Because the braking action applies equal pressure around a full circle, the load is distributed more evenly over the drum. Result: slower lining wear, less maintenance. And landings are safer and smoother with B. F. Goodrich brakes. They respond evenly to minimum pressure, yet are built to handle emergency overloads. They will not lock or grab. Strong retractor springs eliminate brake drag. Relining can be handled with a screw driver and pliers.

This B. F. Goodrich principle of full circle braking is used for all sizes of B. F. Goodrich brakes—from light private planes to huge bombers. It's one of many aviation developments that have come from B. F. Goodrich, leader in rubber research and engineering.

Other B. F. Goodrich products for aviation: tires and wheels, De-Icers, heated rubber, inflatable seals, Pressure Sealing Zippers, Avtrim, fuel and oil cells, Rivnuts, hose and other accessories. For more information write *The B. F. Goodrich Company, Aeronautical Sales, Akron, Ohio.*

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American Aviation

VOL. 18, NO. 8

NEW TRANSPORT DEVELOPMENTS SHOW . . .

U.S. Is Not Ready to Give Up Leadership

Turboprop Super Connie and YC-130 make first flights as Douglas talks of DC-8

By WILLIAM D. PERREAULT

ELEMENTS of the industry which were fearful of losing American leadership in the air transport field were further heartened last week as transport equipment developments, both military and civil, again took the play away from other aviation news.

On top of the interest evidenced by military and commercial officials last month in U. S. jet transport developments, two new turboprop-powered planes made their first flights and another U. S. company revealed its readiness to produce a jet transport. At the same time, the piston-engined transport continued to make headway in the face of turbine developments. The highlights:

• Lockheed's turboprop R7V-2 Super Constellation made its first flight on Sept. 1. Powered by four Pratt & Whitney T34 engines, rated at 5700 horsepower each, the Navy plane is one of two testbed installations with these engines.

• Douglas's engineering vice president, Arthur E. Raymond, speaking before the Swedish Aeronautical Society, commented: "I think we will sometime come out with a turboprop version of the DC-7. We cannot, however, do so until a suitable engine is developed and ready. This engine must have low specific fuel consumption and produce 4000 to 4500 horsepower . . . capable of improving both cruising speed and the economy of the airplane from 15-20%."

• Top Allison officials completed their tour of west coast airframe plants where they promised Douglas, Lockheed, and Convair that advanced versions of the T56 engine, now rated at 3750 horsepower but scheduled for growth above 4000 horsepower, would be commercially available in the spring of 1957 with two years' military experience to verify its economy and reliability.

• Backing up Allison's hopes, the Lockheed YC-130 made its first flight late in August. Powered by four Allison YT56 engines, rated at 3250 horsepower each, this is the initial prototype of a series of C-130A turboprop transports to be built at Lockheed's Marietta, Ga., plant, with deliveries starting in the spring of next year.

• Douglas, Raymond reported, has spent nearly $3 million over the past three years on DC-8 jet transport development, including 250,000 engineering manhours. "If we are successful in obtaining the prerequisite governmental backing, in the form of a military order, we will also produce the DC-8," he said.

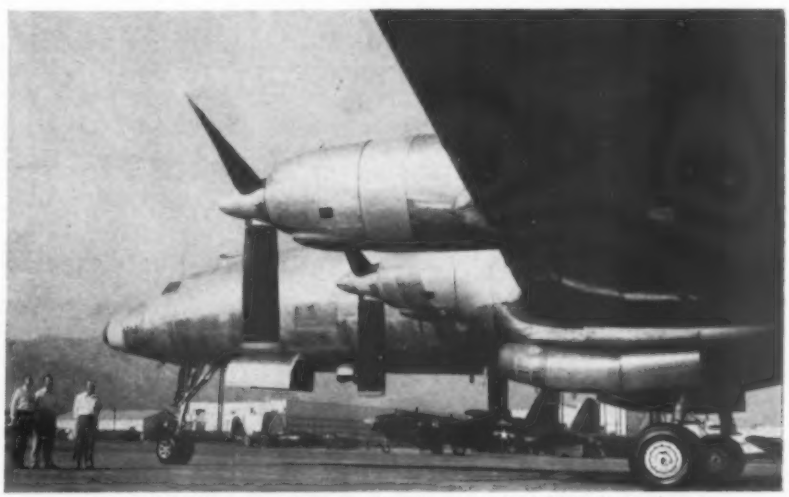
Big piston-engine order

Meanwhile, the piston-engine transport was holding its own. United Air Lines, which had previously ordered and taken initial deliveries on 25 Douglas DC-7's, voted $21 million for an additional 17 Douglas transports—10 DC-6B's, five DC-6A cargo planes, and two more DC-7's UAL actually voted $25 million with the extra $4 million to be used to equip the fleet with C-band (apparently Radio Corp. of America's) airborne radar for in-flight weather mapping.

Simultaneously, Convair announced the development of a cargo version of the Convair 340. Principal difference between the Convair Freighter, which has been ordered by the Navy as the R4Y-1, and the commercial aircraft is the incorporation of a large hydraulically operated cargo door, increase in the gross weight to above 47,000 pounds, and use of an extruded magnesium cargo deck. The cargo door on this twin-engine freighter, which is attracting considerable airline interest, is 10-feet wide and six-feet high. Payload over medium ranges is 7½ tons.

Significantly the Navy's contract with Lockheed Aircraft Corp. for the 440 mile-per-hour turboprop Connie requires that it meet CAA certification requirements, which would go a long way toward simplifying commercial sales. Pratt & Whitney had previously placed the T34 on the commercial market but withdrew it within a few months' time.

There is no immediate indication of early commercial efforts with this



The Navy's R7V-2 Super Connie with turboprops—first flight September 1.

engine and airframe combination.

Through the parallel U. S. Air Force contract, Lockheed is well along on an Allison T56-powered version of the Super Connie which will be operated by the Military Air Transport Service as a testbed for this engine and airframe combination.

Douglas's own turboprop transport program was moving along at a good pace with west coast reports that the prototype YC-124B was accumulating the first actual service flight time of P&W's T34. P&W's only previous flight time with the engine had been in the nose of the Boeing B-17 testbed where it could not be used during take-off or landing due to propeller clearance problems.

Douglas's more advanced turboprop transports, the YC-133 and YC-132 are also progressing. These planes will carry payloads of approximately 85,000 and 125,000 pounds, respectively, it is reported.

Raymond's statements on progress on the DC-8 jet transport were particularly informative. Douglas, while admitting work on a jet transport design, has said virtually nothing specific about the aircraft. The Douglas engineer disclosed the DC-8 will cruise at approximately 550 miles per hour, have good low-speed characteristics, a 30-degree angle of sweep back, and unusual flap efficiency, but would not require slots, spoilers, and other control and stability devices.

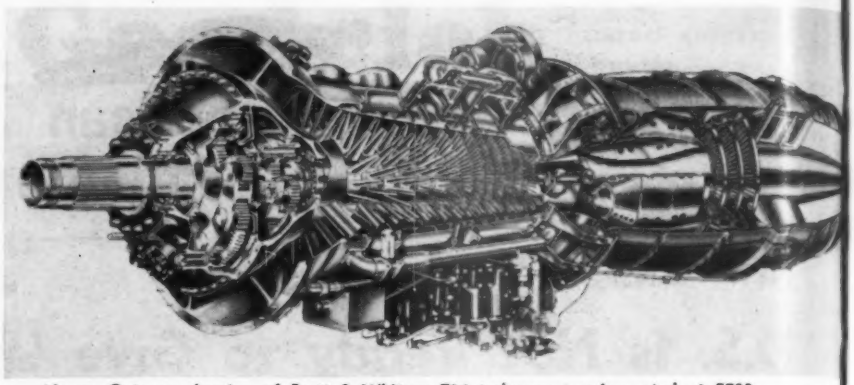
Regarding range, Raymond said: "Another goal was to get long range, enough to cross the North Atlantic non-stop against winter headwinds, without having to resort to external tanks for carrying fuel. We have also succeeded in doing this, through in the early stages of the design it did not look as though we could."

Although unable to completely eliminate power controls on the DC-8 design, Douglas has a system which only uses power for extreme operating conditions. Normally, control operation is manual.

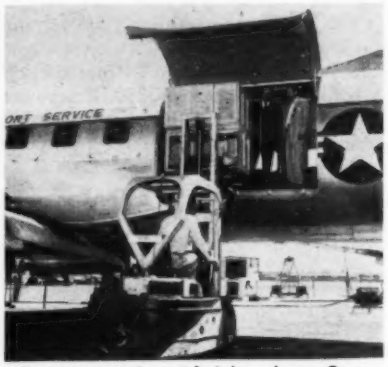
Raymond also noted the company's interest in a smaller turboprop aircraft, "either two- or four-engine, to handle the medium- to short-range job" with "markedly lower cost per mile . . . the design must await the appearance of a developed engine of suitable power and fuel specifics."

Helicopters have also been under study at Douglas, he said, but "the difficulties are high cost of operation and low service life and we do not think these can be overcome quickly."

What does Douglas's chief engineer think of the Vickers Viscount, the British aircraft that has successfully invaded the U. S. transport market? "I would like to reserve judgment on the only turboprop airliner now operating in quantity commercially until more time has gone by. The manufacturer of the airframe and the manufacturer of the engine are both good and it deserves to succeed; it has already achieved a considerable degree of success. At the least, it will go a long way toward proving what a turboprop can do and will point the way to more advanced later types." • • •



Above: Cutaway drawing of Pratt & Whitney T34 turboprop engine rated at 5700 horsepower. Four of these engines powered the first flight of Lockheed's R7V-2.



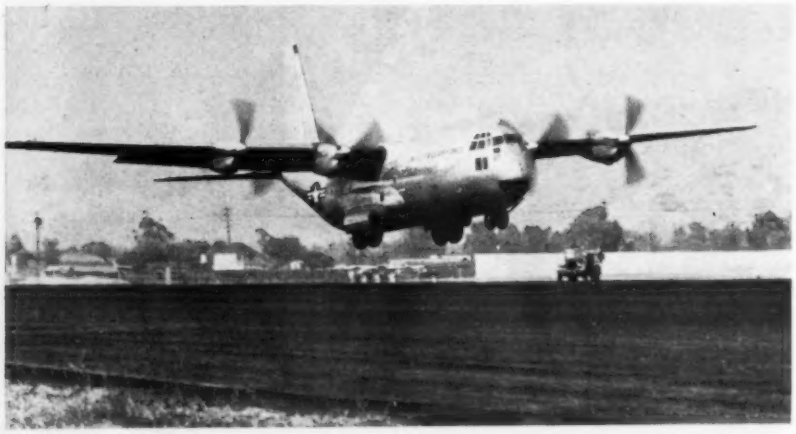
To meet growing airfreight volume, Convair has developed a cargo version of its 340 with hydraulically operated door 10-feet wide and six-feet high.

Lewis, On Tour, Says 717 Order Is Less Than Half 88

European offshore procurement facilities for the USAF are undergoing an inspection by Roger Lewis, Assistant Air Force Secretary (Materiel). Accompanying Lewis on the tour, which is scheduled to last from September 9 to 29, are Lt. Gen. Donald L. Putt, Deputy Chief of Staff (Development), Brig. Gen. Harley S. Jones, Assistant to the Deputy for Procurement and Production, AMC, Max Golden, Lewis' deputy for procurement and production, and Col. Donald W. Graham, executive officer.

Before leaving for his trip to Europe and North Africa Lewis declared that the report of 88 programed orders for the Boeing 717 jet tanker-transport is incorrect, that the actual figure is less than half that number and that the USAF's tanker competition has not been affected by the order.

No orders have been placed for the Republic F-84J, powered by a General Electric J73, or for an all-weather interceptor version of the North American F-100, Lewis also stated.



Four 3250-horsepower Allison T56 turboprop engines lift the Lockheed YC-130, USAF cargo-personnel carrier, on its first flight at Burbank. This is the first AF transport designed from the outset for turboprop power.

Thermal Barrier Called Major Problem

The era of push-button warfare with guided missiles may soon be upon us, but the problem of the thermal barrier calls for a major research effort, and we could well benefit from an immigration policy that would bring more foreign scientists to this country, the American Legion was told during its convention in Washington.

The problems of finding materials that will maintain their strength and shape at the temperature encountered at speeds of Mach 2 and above were outlined to the Legion's National Security Commission by DeWitt C. Ramsey, president of the Aircraft Industries Association. Ramsey also reported that the aircraft industry is currently building 900 to 1000 planes a month, and is successfully pushing its cost-reduction program.

Rep. Carl Hinshaw (R-Calif.) told the Legionnaires the days of the manned bomber and the manned fighter are numbered, and that the practicability of the nuclear-powered airliner should be determined within the next decade. He also suggested that the quality of U. S. scientific effort would be improved by a more lenient immigration policy.

J33/T40-Powered Planes Grounded by Navy

Troubles with two Allison powerplants, the J33-A-16 turbojet and the T40 turboprop, have caused the Navy to ground all aircraft using these engines.

The T40 grounding order, reportedly the result of troubles with the gear box, came after a Douglas A2D crashed. Planes affected include the A2D, Convair R3Y flying boat, and two vertical take-off fighters, the Convair XFY-1 and the Lockheed XFV-1.

Because of fuel nozzle support failures in the J33-A-16, all F9F-4 Panthers and F9F-7 Cougars (both built by Grumman) are being kept out of the air as a safety precaution. No recent crashes were involved. The F9F grounding is expected to be of short duration.

Engineers To Talk Jets

Main theme of the annual engineering and maintenance conference, held by the Air Transport Association, will be jets, according to a tentative agenda. The October 12 and 13 meetings in San Francisco will include talks on "The Human Side of Tomorrow's Airplane," by Lockheed-Marietta's B. A. Martin, on initial experience with the Boeing 707 by that firm's K. C. Gordon, and on jet engine maintenance by representatives of British European Airways and the Strategic Air Command.

Discussions will also be featured on the advantages and disadvantages of job card work control in airline overhaul programs, and equalized line maintenance inspection systems. Guest speaker Jerome Lederer, of the Flight Safety Foundation, will discuss the relation of maintenance to flight safety.

GEN. METZGER LEAVES AIR FORCE POSTS

The head of the Air Materiel Command's Industrial Resources Division and the joint Aircraft Production Resources Agency, Maj. Gen. Kern D. Metzger, has left the USAF, reverting to inactive status. He will be succeeded in his AMC post by his deputy, Col. Henry G. MacDonald, but a replacement has not yet been selected for the APRA job.

APRA is responsible for determining military requirements for various aircraft metals, including titanium, and allocating the available supply to the aircraft industry.

Metzger will remain in the USAF reserve but will return to private interests in Cleveland.

Spartan Moves Facility To Camp Rucker

Spartan Aircraft Co. is in the process of moving its Army maintenance division to Camp Rucker, Ala., from Ft. Sill and Frederick, Okla., in conjunction with the transfer of the Army Aviation School to the base. In excess of 450 personnel are involved in the move, which is scheduled to be completed by April, 1955. Spartan will maintain a small crew at Ft. Sill.

The maintenance firm holds a $5,145,000 annual contract with the Army in the only military-civil agreement of its kind, whereby Spartan conducts all maintenance work on both helicopters and liaison aircraft used by the school. Several large warehouses at Camp Rucker will be converted into maintenance shops.

Capital's Financing Directly with Vickers

Capital Airlines is financing the purchase of its 40 completely equipped Viscounts (costing $966,300 each including duty) and aircraft spares directly with Vickers-Armstrongs, whereas the supply of spare engines and engine parts is being financed directly with Rolls-Royce.

Upon delivery of each aircraft, spare engine, and shipment of spare parts, the purchase price is to be amortized in monthly payments over a 60-month

THE USAF MARTIN B-57 bomber, now in production at the Martin Company, lets its meanness show in this unusual photo. Plane is equipped with the new Martin-developed rotary bomb door which can be revolved in a few seconds to bring its bombs out into the open for release. Door can also be removed from the bomber, pre-loaded, and then hoisted back into position. Those are napalm tanks hanging under the wings. The B-57 made its first appearance before the public at the Dayton Air Show.

period from date of delivery of each unit. Unamortized balances will bear interest at a rate of 1¾% per annum in excess of the prevailing Bank of England rediscount rate at the date of payment (the present rediscount rate is 3% per annum). Payments of principal and interest will be made in pounds sterling with no penalty for prepayment.

The amounts owing to Vickers and Rolls-Royce will be secured by chattel mortgages. Net proceeds, after retirement of Capital's present bank loan (resulting from future sales of flight equipment), will be paid to the two British firms.

Capital will realize a cash gain of about $3,850,000 (before modification costs and taxes) from selling BOAC its seven L-749 Constellations and buying BOAC's seven L-049's. The L-749's will be sold at $1,350,000 per plane for a total of $9,450,000 while the BOAC aircraft will be bought at $800,000 each for a total of $5,600,000.

Tougher CAB Attitude On Subsidies Indicated

Using a Piedmont Aviation mail rate case as the vehicle, CAB recently served notice on the local service airline industry that it will not provide additional subsidy for what it considers "unwarranted flights."

At the same time, CAB indicated a tougher attitude would prevail when increased subsidy demands are predicated on higher wages, increased fuel and parts costs, etc. In such cases, the Board said, the carriers should strive to meet these increased costs through increased commercial revenues.

For Piedmont, the decision would mean $179,783 less mail pay annually than CAB had originally decided in July to give it.

For the industry, it means that if additional schedules result in lower load factors and higher subsidy needs, CAB will not foot the bill.

On the overall question of subsidies, the Board had this to say: "We believe that the success of the local service experiment, which the Board has continuously fostered, depends in large measure upon their ability to bring about a continuing trend toward ultimate self-sufficiency. This, in turn, depends to a large extent on the local service airlines achieving the optimum productivity and maintaining an increasingly favorable balance between costs and revenues.

"If costs go up—whether it be the cost of gas, parts, or wages and salaries for management or other personnel within the organization—such increased costs should be met through increased commercial revenues or they will tend, in the long run, to defeat or to minimize the scope of the local service experiment."

RECORD BREAKING Army H-39 (Sikorsky S-59) helicopter shows its trim fuselage built for speed. Barely visible is part of retracted main landing gear under pilot. On August 26 the streamlining efforts paid off with a new world's helicopter speed record of 156.005 miles per hour.

Permanent Certificate Asked by Mohawk

Mohawk Airlines has applied to CAB for a permanent certificate and has asked the Board for expeditious action claiming it is in a better position now than was the trunkline industry in 1938 when permanency was granted to those carriers.

The carrier, first to file for a permanent license since the recent activity in Congress favoring permanent local carriers, said it has established a *prima facie* case to back up its bid.

No new route or service proposals are involved in the application which merely asks CAB to substitute the word "permanent" for the word "temporary" in the present certificate and to strike the expiration date of June 30, 1958.

The carrier said permanency will (1) assist in obtaining equity financing. (2 assure the retention of competent, enthusiastic personnel, and (3) improve the ability of Mohawk to plan its future operations.

Comparing itself for the year ended June 30, 1954, with the trunk industry for the calendar year 1938, Mohawk showed its average passenger load was 11.38 to 7.02 for the trunks; its load factor was 54.17% to 50.43% for the trunks, and its break-even need per passenger was $4.90 to $13.20 for the trunks.

Mohawk also showed that its subsidy need per passenger has dropped from $10.55 in 1950 to $4.72 this year while its traffic has more than tripled.

BELL PREDICTS 250-MPH CONVERTIPLANE

A five-place convertiplane based on the Army's tilting-rotor XV-3 will be ready for corporate users in about four years, Bell Aircraft Corp. predicts. A larger airline version, carrying 30-40 passengers, will be ready about four years after that as a possible replacement for the DC-3.

Robert L. Lichten, chief experimental projects engineer at Bell-Fort Worth, says the business convertiplane will cruise at about 220 mph and will cost about $75,000. The model being prepared for short-haul passenger service would cruise at 250 mph and cost $500,000, he said.

Bell, meanwhile, has worked up a table comparing a 250-mph convertiplane with a standard helicopter (100 mph), a DC-3-type feeder liner (170 mph), a piston airliner like the DC-6 (300 mph), and a jet like the Boeing 707 (550 mph) over distances ranging from 100 to 1000 miles.

Figuring the time for each type of aircraft from downtown to downtown (including the required flight-time, taxi-time, and surface transportation), Bell's study shows the convertiplane, because it can take-off from a downtown location and land similarly, takes less time than any of the others at distances up to 600 miles.

At 700 miles, it still beats the jet but the 300 mph piston airliner has a 30-minute edge. Between 800 and 1000 miles, both the DC-6-type and the 707 would require less time for the total trip than the convertiplane.

Lockheed Sales, Earnings at New Highs

DURING the recent American Legion convention in Washington the Legionnaires were told by the president of the Aircraft Industries Association, DeWitt C. Ramsey, that the aircraft manufacturing industry was "in a good state of health." Just how robust one segment of it is was revealed a few days later when Lockheed Aircraft Corp. released the figures on the most profitable six months in its history.

Net earnings for the first half of 1954 totaled $10.9 million, or $4.05 a share, up from the previous year's $9.1 million, or $3.42 a share. Sales, too, reached a record high: $405.4 million, up from $389.1 million.

Lockheed earnings for the first half of the year surpassed those for the entire calendar year of 1952 by almost 20%. Backlog at June 30 for Super Constellations alone stood at $140.4 million. Lockheed reports that it is now "well past its 6000th jet."

Lockheed's customers among the airlines were also making news as they set their houses in order. Just ahead of Lockheed's earnings report had come word that an exchange of Constellations had been negotiated between **Capital Airlines** and **BOAC.** Seven L-049's will go to Capital, seven L-749's to the British carrier. Each line will thus have all its Constellations of the same type. Capital will also benefit from a financial adjustment. The switch will be completed by June.

Other late business developments:

Fairchild Engine & Airplane Corp. has renewed a licensing agreement under which it may build the Fokker twin-engine turboprop transport, the F.27. Firm production plans await the result of flight tests and market surveys. The F.27 is due to fly in May.

The Air Force has fixed the sale price of its C-46's and will announce it shortly. When the 50 now being leased are sold, USAF will, in effect, be out of the leasing business. There are 300 others owned by USAF, some of which may also go on the block.

Continental Aviation & Engineering Corp. is to build $2 million worth of J69 Marbore engines for USAF. The 1000-pound-thrust powerplant will go into the Cessna T-37 twin-jet trainer. The firm has also received a $2 million facilities contract.

Chance Vought Aircraft, Inc. will pay its first dividend as an independent company on September 27 when it distributes 40¢ a share to stock of record September 10.

The Garrett Corp. will also pay 40¢ a share (quarterly dividend) on September 25 to stock of record Sept. 8.

Curtiss-Wright Corp. will pay 25¢ a share on September 23 to stock of record September 7. Dividends for previous quarters were 15¢.

Continental Air Lines earnings (excluding capital gain) for the first seven months of 1954 were 93% above the similar period for 1953, totaling over $153,000. Operating revenues for the period reached $6.8 million, up 9%.

The Atlas Corp. has sold substantial holdings in Boeing (3000 shares), Douglas (2000), Lockheed (5000), and North American (5000) during the first half of 1954, while increasing its holdings in Northrop (from 31,900 to 35,900). Atlas ownership of General Dynamics stock also increased when, under terms of a merger agreement, 30,300 Convair shares were exchanged for 17,314 shares of G-D.

USAF prime contractors with unusual subcontracting problems will meet with Air Force officials in Chicago on September 28. Two hundred of the largest have been invited, primarily to discuss complaints from small subcontractors about contract cancellations. Similar meeting of eastern firms is scheduled for October in New York.

Republic Aviation Corp. is cutting its work force by 10% for two or three months as a result of a pile-up of completed planes which need further modification before delivery to the Air Force.

The Office of Defense Mobilization has reinstated the possibility of rapid tax write-offs for military aircraft production where it can be demonstrated that a shortage exists. Such goals had been suspended late last year.

Riddle Airlines' management has been reorganized at a stockholders meeting. John Paul Riddle, founder, succeeds W. R. Boyd as president. Boyd continues as executive vice president and general manager. Both were named to the board of directors.

United Air Lines several years ago considered buying Colonial Airlines, but decided against it, according to UAL president W. A. Patterson. United's disinclination to add more small cities to its routes, which already have a relatively large number of them, was cited as the reason the idea was dropped.

Emery Air Freight Corp., authorized freight forwarder, reports six-months net of $23,600, down from $43,200 for the similar period in 1953. Revenue fell from $2.53 million to $2.48 million.

Parker & Co., aviation insurance firm, has moved its New York office to 99 Park Avenue, New York 16.

PROCUREMENT NOTES

USAF statisticians have computed the assets of the Air Force to be "about 75 billion dollars." The assets of 24 of the largest USA business firms total $58 billion.

The Air Force will spend $16 billion this fiscal year, of which over $7 billion will be for aircraft and equipment.

The Navy has only nine letter contracts now that are two years old as against 94 a year ago. Most of these are on the point of conversion to firm contracts. The total backlog of letter contracts has been reduced $4.2 billion in the last 12 months by the Navy to $800 million as of August 1st.

Defense Secretary Wilson's Fiscal Advisary Committee, after a year's study, is expected to make its final report in October on improving the internal accounting system of the Defense Department. Robert E. Gross, president of Lockheed Aircraft Corp., directs a working group, Procurement Activities, of this committee covering expenditures of $20.5 billion. Of interest to industry is their recommendation of the re-enactment of the Contract Settlement Act and the Surplus Property Act.

While considerable attention and much concern has resulted from Pentagon efforts to rewrite the cost allowance regulations for procurement contracts (Section XV, Armed Services Procurement Regulations), little interest has been shown in the overhauling of the reimbursement rules (Sec. VIII, ASPR) for terminated contracts, now being revised. The plan to combine these two cost allowance principles by giving additional amounts for terminated contracts has now been abandoned.

A tentative price of $5.50 has been suggested for copies of the new 1200-page Air Force Procurement Instructions to be available within 60 days. It supersedes a two-foot pile of USAF procurement (70 series) manuals, regulations, instructions, letters, directives, etc., in current use. Orders should be mailed now to the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

The Washington View

Helicopter-Lease Delay

Army plan to lease a limited number of helicopters to commercial operators is currently held up, possibly for several months, pending development of a program of cooperation with the Navy and Marines. Initially it was an all-Army project, but Defense Secretary Wilson has decreed it will be a Department program in granting final approval. Wilson has directed the Army to cooperate with all government agencies concerned and to work through them.

Included in the Army's tentative plan of operation are these major points: (1) CAB will select the carriers to receive Army helicopters; (2) There are to be more than 15 helicopters made available, to be released in groups of five for a period of five years. They will be 30-passenger models.

An Attempt to Clear the Air?

There is little expectation of early hearings by the Senate Interstate and Foreign Commerce Committee into the question of a second commercial airport for Washington, D. C. Preliminary committee staff work has only just begun and until it is completed no date will be set for the beginning of hearings.

The proposed hearings were set up by Committee Chairman John Bricker (R., O.), who assigned the task to the six-man aviation subcommittee which he also heads. Bricker acted at the request of Sen. John M. Butler (R., Md.), who has long advocated the use of Baltimore's Friendship International Airport as an alternate for Washington National.

Butler's suggestion was that there should be an investigation of the stalemated negotiations for joint civil-military use of Andrews Air Force Base in nearby Maryland as a secondary Washington airport. Butler and the rest of the Maryland delegation are dead-set against any commercial use of Andrews and apparently felt a hard-hitting investigation could clear the air—to the extent of knocking out Andrews—and pave the way for further consideration of the Baltimore setup.

However, Bricker's subcommittee has yet to meet since Congress adjourned, much less to organize, and nothing more has been done than to send letters to interested government agencies and industry groups requesting information on points that might be taken up.

More Air Power

From within the Air Force and in public statements, particularly those of Gen. Thomas D. White, AF Vice Chief of Staff, there are increasing signs of concern that a level of 137 wings by July 1957 will not be enough.

Time after time, in recent speeches, General White has been hitting away at the fact that 137 wings won't do. Recently he said, "if the Soviets continue to lower their living standards and make great sacrifices in order to enlarge their air power, we may have to revise our plans." He also told an AIA gathering in Dayton last week that "if aggressor air power continues to grow, our Air Force must grow too."

The Air Force's job in his opinion, White said, is two-fold: (1) to keep much stronger than the Soviet in offensive power, and (2) to continue to improve U. S. defenses. What this should mean to the aircraft industry was summed up by White as "thus any departure from the (137-wing) steady level of demand will be upward. Stability of our demand for aircraft should allow the industries to plan further into the future, schedule production more efficiently, and be able to give the nation more air power for its money."

Nuclear-Powered Airliners

Rep. Carl Hinshaw (R., Calif.), who has been consistently identified with commercial aviation progress through his work on the House Commerce Committee, displays the same knowledgeable grasp of problems in the future for both civil and military aviation in the atomic energy field.

A member of the Joint Congressional Atomic Energy Committee, Hinshaw has declared that "nuclear powered airliners may be practical." He said it should be determined within the next 10 years. The California lawmaker also cited the nuclear powerplant as the development which will bring about "the first supersonic aircraft of unlimited range."

Hinshaw has said he envisions the defense fighter as probably on the way out. "I feel we may be approaching the point where we can see the end of the manned bomber, and we may well be entering the era of true pushbutton warfare."

Management Study Write-Off?

Latest development in the case of the highly controversial management study of the Civil Aeronautics Administration, which was ordered by the Commerce Department, is a report that the consulting firm hired to do the job has asked for an additional $35,000 in payment for a final report. This would be an extra fee over and above the $104,500 already spent for the survey, an expenditure made out of CAA's salaries and expenses budget.

In the meantime, Colin H. McIntosh, special assistant to Commerce Secretary Weeks, returned last week from a tour of CAA regions after viewing operations with an eye to implementing the survey recommendations. However, most observers predict the expensive survey will be written off inasmuch as (1) Congress put the curb on Commerce for any reorganization of CAA during fiscal 1955, and (2) there is a White House plan for a complete reorganization of both CAA and CAB.

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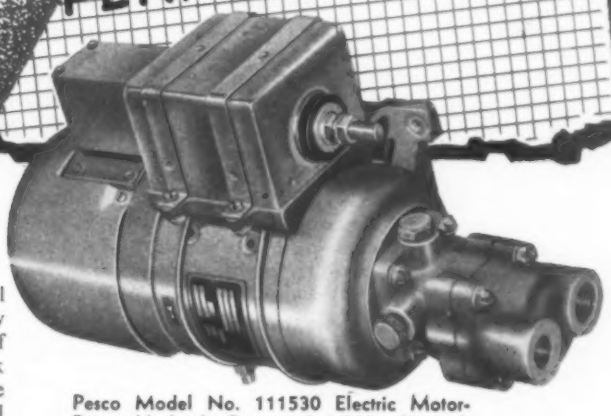

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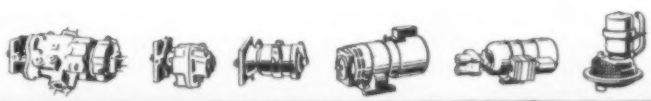

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What Lockheed Is Aiming for In the Guided Missile Field

With Quesada at the helm the new division hopes to make up for lost time

By Fred S. Hunter

ONE of the more interesting developments in the industry has been Lockheed's plunge into the guided missile field.

If Lockheed was late in getting started, it is evident that President Robert E. Gross is out to make up for lost time. Plunge is surely the right word. The Lockheed corporation never got so completely immersed in so big a project so fast in all its history.

The man entrusted with the job of catching up is Lieut. Gen. Elwood R. Quesada, who first came into Lockheed as a director of the corporation, later was elected a vice president and appointed general manager of the newly created missile systems division.

"We hope to be an effective element of the industry in five years," says Quesada.

The missile systems division isn't starting wholly from scratch, although almost. Lockheed previously developed a test vehicle for ramjet engines. This LTV (Lockheed Test Vehicle) has been used at White Sands for the flight testing of ramjet powerplants being developed by Marquardt Aircraft Co. and Wright Aeronautical.

When asked if a natural follow-on from this already-established article might be for Lockheed to go after a companion missile to Boeing's Bomarc for the Air Force, Quesada said:

"We feel there is a natural place for us in the ground-to-air field."

He also indicated Lockheed's strong interest in ballistic-type missiles. "This field is wide open and we are new and uncommitted," said Quesada.

Equal corporate status

In its corporate setup, Lockheed has given the new missile systems division equal status with the California division and the Georgia division. It's also given it $10 million.

When final assembly on the T-33 jet trainer and jet production flight moved out of Plant B-9 at Van Nuys for Palmdale this spring, the missile systems division moved in. Lockheed spent approximately $1 million plushing up the facility, which it leases from the Los Angeles Department of Airports and which comprises two big hangars, an office building, and extensive paved areas.

Next capital investment will be $4 million for a scientific laboratory for advanced research, on which construction will be started as soon as details can be cleared.

Already on the job is the man who will run this laboratory, Dr. Ernst H. Krause, former associate director of research at the Naval Research Laboratory in Washington, and several other scientists who will be associated with him. They include Dr. Montgomery H. Johnson, formerly of the University of California's Livermore Laboratory, named associate director, Dr. Eric Durand, formerly associate director of the Chicago Midway Laboratories, Edward J. Zadina, formerly technical adviser and operations analyst with the Air Force Special Weapons Center at Kirkland AFB, and Henry R. Senf, formerly acting director of development for the CAA Air Navigation Development Board.

The missile systems division now has 700 employees. By year-end it expects to have 1000. Quesada's aim is to have a small number of highly qualified people who will be able to take on difficult jobs, placing emphasis on the analytical approach.

Won't cover the waterfront

"We expect to concentrate on a few difficult problems and not try to cover the waterfront," he said.

The missile systems general manager has the division's research and development program well worked out. In round numbers, the personnel breakdown in this section will be 25% Ph.D.'s., 25% masters, 50% bachelors. These will be augmented by 200 technicians and 100 administrative personnel.

Quesada has some philosophies of his own, too. Just as a company knows it has to plow back a percentage of its profits to maintain progress, he feels a laboratory has to reserve a portion of a laboratory's time for the overall interests of the company. Thus he'll never load the new research lab with contracts. His top limit will be 80% of capacity, leaving never less than 20% to be devoted to the proprietary interests of Lockheed itself.

Environmental equipment is included in the missile systems with which Lockheed expects to concern itself. Within certain areas, it envisages the three-way role of researcher, developer, and producer. In other areas, like powerplants, it plans the role of sophisticated, informed buyer.

Missile Planners

Elwood R. Quesada (left), vice president and general manager of the Missile Systems Division of Lockheed Aircraft Corp., and Dr. Ernst H. Krause, director of the scientific laboratory.

"We hope to have systems responsibilities," said Quesada. "On the other hand, we are not averse to cooperative efforts with others in which they will have system responsibilities."

Producibility and reliability

Quesada goes on to note that an objective of the new division is producibility with emphasis on the military's high standards of reliability. In other words, it's intended that the articles the division produces will come out the back door on schedule and O. K.

Heading up Quesada's engineering section is Willis M. Hawkins, who, before he became chief engineer of the missile systems division, was chief of preliminary design for Lockheed. One of his more notable contributions to Lockheed aircraft was the new wing developed for the turboprop C-130 for the Air Force, now entering the first phase of its flight testing.

"With our engineers and scientists working together, we can expect that our products not only will do the desired job, but can be quantity-produced quickly and efficiently," said Quesada.

Don J. Murphy, who formerly was with Lockheed, has returned to the company from Toledo Scales of Canada, where he was vice president and general manager, to be production manager of the missile systems division. Herschel J. Brown, formerly chief accountant for the California division, is director of administration. • • •

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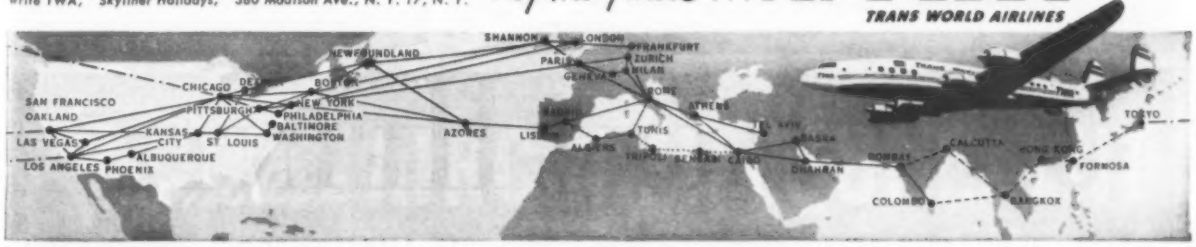
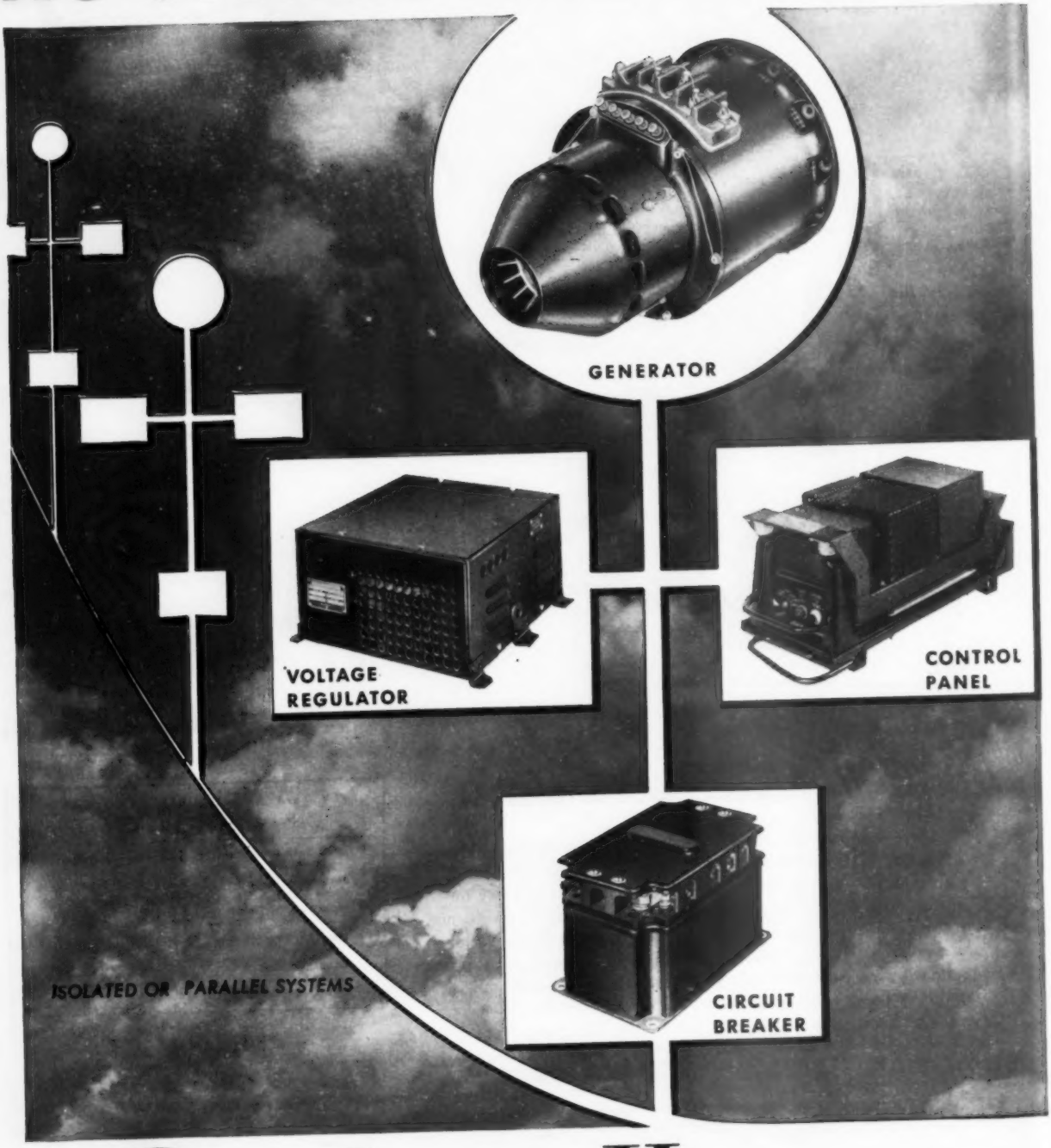


A-C SYSTEMS FOR AIRCRAFT



J&H JACK & HEINTZ

...a report from JACK & HEINTZ

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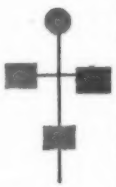
*Better than required by MIL-G-6099 and applicable drawings.

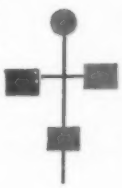


CONTROL PANELS: Designed to applicable USAF and Navy specifications, J&H Panels can also be built to special requirements. They can operate either from the d-c bus or independent of it.

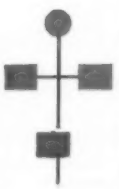
J&H Panels include any or all of the following functions (which can be supplied as individual components, if desired):

Generator control-relay · Over-voltage protection†
Undervoltage protection · Phase-sequence protection · Under-speed or under-frequency protection
Anti-cycling · Power indication · Field flashing
Special interlocking

†Overvoltage relay is insensitive to acceleration forces.



VOLTAGE REGULATORS: Designed to MIL-G-6099 and applicable drawings, J&H Regulators are of the static-magnetic-amplifier type. Weighing only twelve and one-half pounds, the regulators feature a magnetic reference eliminating the use of electronic tubes. Provision is made in all regulators for reactive load division function.



CIRCUIT BREAKERS: Designed to MIL-C-8379, J&H Circuit Breakers have the following outstanding features which make them exceptionally well suited for use on high performance aircraft:

Balanced rotary latch
Direct solenoid-actuated contacts
Noncritical adjustment of interlock contacts
Easy inspection of main contacts

OTHER COMPONENTS: In addition to the panel functions which can be supplied as individual components, Jack & Heintz has developed transformers, reverse power relays, phase sequence relays and other auxiliary a-c system components.

Jack & Heintz engineering personnel and manufacturing facilities are geared to undertake design and production of complete a-c systems or individual components. We invite your inquiry. Write Jack & Heintz, Inc., 17633 Broadway, Cleveland 1, Ohio.

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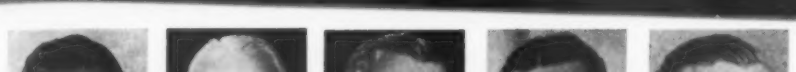
Rotomotive AIRCRAFT EQUIPMENT



Navy officials, are the comparatively young managers of its operating de-

Drawing depicts what shows on the screen when "shell" scans Cape Cod.

Here's Sperry's . . .

NEW AIRBORNE RADAR SYSTEM

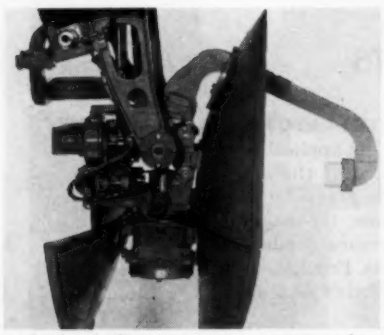
A NEW airborne radar system, designated the APN-59, has been revealed by the Air Research and Development Command. The system, weighing only 150 pounds, has a range that is adjustable from three to 250 miles. One photo taken of the radar scope during a test over Lake Erie clearly showed cities at both ends of the lake, which is 250 miles long.

Development of the system was conducted jointly by Sperry Gyroscope Co. and the ARDC. It is described as the most compact and lightweight system for its power and versatility. Uses include search and surveillance, navigation, storm detection, collision warning, and beacon interrogation.

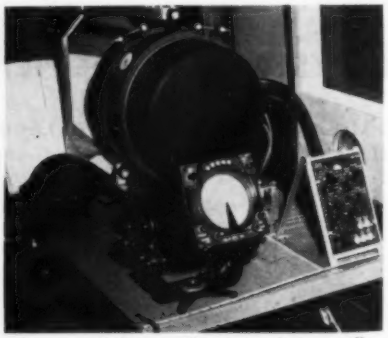
The 18-inch antenna is shaped like a turtle's shell and is stabilized by a gyro to avoid the effect of aircraft pitch and roll. The beam can be used in fan- or pencil-shape and rotated at high or slow speed through either a chosen sector or a full 360°. The antenna can also be tilted up, down, or straight ahead.

The normal screen is five inches in diameter. Additional scopes can be installed if desired and, for larger planes, a 30-inch antenna is being produced by Sperry. The system operates in the 10,000 megacycle, or "X" band. Areas shown on the screen may be oriented to current heading of the aircraft, true North, or any other compass bearing. A black plastic wedge over the face of the screen permits measurement of drift.

Use by the military is contemplated for troop transports or essential cargo planes.



"Turtle shell" antenna is approximately 18" in diameter, is gyro-stabilized.



Large unit houses the transceiver, small object at left is stabilizing gyro.

News Briefs

Trevor Gardner, asst. to AF Secretary Talbott for R&D, is on a two-week tour in Europe on USAF business. Although not confirmed by Senate for Asst. Secretary-R&D post, Gardner has been retained as $50-a-day consultant. . . . **Pratt & Whitney Aircraft** has opened a 40-week course in mechanical design for 50 college graduates, including some employees, who will be paid and given raises for satisfactory grades. Course is equivalent to two years of college engineering and those who pass will join P&W's engineering staff.

Slick Airways has asked CAB to allow a 5% increase in zero fuel weight and maximum landing weight of DC-6A airfreighters for a one-year period. Board had previously granted a similar waiver to The Flying Tiger Line. Operators estimate it increases DC-6A revenue capability by $25,000 annually. . . . **Best safety record** in postwar years was recorded by non-air-carrier flying during 1953, CAB analysis shows. Of 2886 accidents last year, 341 were fatal, 2546 were non-fatal, and 585 fatalities resulted. During 1952, comparable statistics showed 3281 accidents, 352 fatal, 2929 non-fatal, and 626 fatalities.

French Legion of Honor award has been presented to Beverly E. (Bevo) Howard, president of Hawthorne School of Aeronautics and the Aeronautical Training Society, for his services to the French Air Force cadet school at Etamps in 1950 and his part in training of 2000 French pilots during World War II. . . . **Feature speaker** at SAE aircraft production forum and aeronautic meeting (Los Angeles Oct. 5-9) will be Rep. Carl Hinshaw (R-Calif.) winner of the 1953 Wright Brothers Memorial Trophy. Hinshaw will talk on "Atomic Energy."

USAF Air Materiel Command has installed a Remington Rand Univac computer at its Dayton headquarters to improve inventory control and purchasing methods. Unit will be used to compute aircraft spare parts budget, estimate engine needs and compute life expectancy for major parts. . . . **Seaboard & Western Airlines** has taken its seven-year-long bid for a trans-Atlantic cargo certificate to President Eisenhower. In an open letter to the President via full-page newspaper ads, S&W said it is general knowledge that CAB voted 3-2 to grant its certificate and called upon him to uphold free enterprise by approving the Board's decision.

Speculation that The Glenn L. Martin Co. may venture into a turboprop transport project similar to Allison's Convairliner has gained headway with the announced long-term leasing by Martin of a 2-0-2 for a special project. The company will only confirm that it will not be used as an executive transport. . . . **Transocean Airlines** has begun training pilots and flight engineers for Deutsche Lufthansa at its Taloa Academy of Aeronautics in Oakland.

Society of British Aircraft Constructors sees very serious consequences for British aircraft exports if American gifts of aircraft and equipment to foreign countries were to be further expanded. SBAC says the gifts amount to 100% subsidized American aircraft exports. . . . **C-46 program** by Air Carrier Engineering Services will continue according to original plans despite resignation of v.p.-engineering Norman Golden, a company official confirmed. Flight vibration tests of the propeller-engine combination are expected to start between September 20-23.

Mrs. Thomas E. Braniff, wife of the late president and founder of Braniff Airways, died from cancer on August 24, only eight months after the death of her husband.

Detweiler Sallada Gaffney Whitten Turney

Top officials of the industry's newest independent.

Chance Vought Seeks AF Contracts In Drive to Expand Role

By Robert M. Loebelson

IT hasn't been used in "Believe It or Not" yet, but it is a fact that the newest company in the aircraft industry has been turning out military airplanes since World War I.

Chance Vought Aircraft, Inc., of Dallas, which became an independent company on July 1 of this year, built its first airplane (a two-place VE-7 Army trainer) in 1917. CVA's ancestor was the Lewis and Vought Corp., Astoria, N. Y., which became the Chance Vought Corp. in 1920, and the Chance Vought Division of United Aircraft Corp. in 1929. CVA became a UAC subsidiary on January 1, 1954, and severed all connection with the East Hartford, Conn., concern six months later. Between 1939 and 1943, the firm was known as the Vought-Sikorsky Division.

Today, the newest member of the aircraft industry is planning a continuation and expansion of its historic role. While the first plane Vought built was an Army biplane, the company has been a Navy contractor almost exclusively ever since.

But Frederick O. Detweiler, 43-year-old president of the company, says CVA has no intention of continuing to be solely a naval aviation producer. "We're very happy in our relationship with the Navy but that doesn't mean we can't try to pick up some Air Force contracts as well," he states.

Hold a contract now?

Detweiler points out that such attempts are not exclusively the result of the "spin-off" from United Aircraft. "We entered the USAF's interceptor competition three years ago (Convair eventually won the contract for the F-102) and didn't win. But from now on you can be sure that we'll be entered in all Navy and Air Force competitions for which we can qualify."

(Detweiler refuses to confirm a rumor that the Dallas company already holds a Phase I airplane design contract from the Air Force. If the report is true, however, it would be CVA's first USAF airplane contract in many years.)

The company has a good base on which it can enter future design competitions. In addition to the F7U-3 Cutlass twin-jet fighter and the surface-to-surface Regulus guided missile in production at present, CVA has orders from the Navy for an attack version of the Cutlass, the A2U, which gets into production later this year, and the F8U, winner of a 1953 day-fighter competition. As a subcontractor to other major aircraft manufacturers, CVA is turning out components for the Boeing B-47 and the Lockheed P2V.

Successors to the Regulus

Since its preliminary break with UAC in January, when the backlog of orders was listed as $340 million, CVA reported half-year sales of $77.6 million and net earnings of $3.2 million. On June 30, the backlog was given as $283 million, indicating that more than $20 million in new contracts was received during the first half of 1954.

Even without any substantial increase in new orders, however, CVA has at least 18 months output scheduled at current rates of production. But Detweiler and his team have no intention of ignoring new orders. Despite the recent loss of its chief of missile design to its neighbor, Temco Aircraft Corp., Detweiler's company is busy working up successors to the Regulus. "We're designing several new missile types, and all will be either ship- or surface-launched," he reports.

Detweiler heads a work force of about 13,000 employees, just under the company's World War II peak. And about 10% of the work force is made up of trained engineers. CVA's principal assets, aside from its experience and the high regard in which it is held by Navy officials, are the comparatively young managers of its operating departments. While these men have an average of 16 years of experience in the aviation industry, their average age is only 43.

And even the top five men in the company have an average age of 51, because Detweiler is 43, H. B. Sallada (vice president) is 59, J. J. Gaffney (secretary) is 56, N. V. Turney (controller) is 44, and B. W. Whitten (treasurer) is 54.

Facility leased from Navy

The company's production facility is leased from the Navy and contains 2.3 million square feet. Since moving to Dallas from Stratford, Conn., in 1948, CVA has spent about $11.5 million on improvements and additions and is now investing another $1 million in a low-speed wind tunnel. The Navy has simultaneously (since the beginning of the Korean war) made available $12.5 million for machine tools and $9.5 million for new construction. Thus far, $7 million of the Navy money for tools and $7.4 million for facilities has been spent.

All in all, therefore, Chance Vought is looking to the future with even more than typical industry confidence. Firm in planning no commercial work, CVA is certain that its present and anticipated Navy contracts, coupled with those which it may eventually win in Air Force competitions, will keep it growing. The production plant is modern, the management team young but experienced, the planes and missiles desired. As long as the military services keep buying airplanes, Detweiler & Co. feel they can't lose. • • •

Unspent Missile Funds Total $1 Billion

Guided missile funds unobligated by the Defense Department as of June 30 totaled $255.3 million, with an additional $1.1 billion obligated but still unspent as of that date, according to W. J. McNeil, Assistant Defense Secretary (Comptroller).

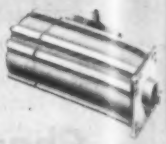
The unobligated balance was mainly in the hands of the Air Force ($195.6 million) with smaller sums held by the Army ($24.5 million) and Navy ($35.1 million).

Unexpended balances left at the end of the fiscal year were more evenly divided between the services: USAF, $475.7 million; Navy, $362.5 million; and Army, $270.7 million.

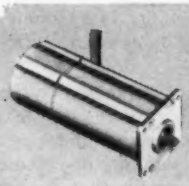
During the fiscal year just passed the Defense Department placed $634.5 million in orders and paid out $298.1 million.

Fast action clutch-brake of unique Lear design utilizing two opposing coils to force clutching and declutching. Increases the speed of both operations. Typical application: digital mechanical computor.

Specially designed Lear motor utilizing offset gear train to allow close tolerance between mounting surface and output shaft. Typical application: aircraft scavenger pump.

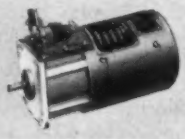


Lear intermittent duty AC motor. Has high torque AC brake capable of stopping both rotor and connected inertia load. Typical application: positioning actuator for jet engine air intake doors.



Lear AC brake motor with exceptional environmental resistance. Non-corrosive materials used throughout, including laminations. Typical application: aileron trim tab actuation.

AC motor of the air-over-totally-enclosed type. Has special mylar high dielectric insulation. Typical application: hydraulic pumps.



Synchronous AC motor. Has exceptional high starting torque which overcomes starting drag characteristics. Provides optimum low temperature operation. Typical application: radar scanning device.

DC intermittent duty motor incorporating Lear Fastop Clutch. Extensively used for heavy duty. Typical application: cowl flap power unit.

Miniature DC motor. Unusual specifications required armature which could be stalled continuously and a field to match 10,000 ohm impedance of vacuum tube amplifier. Typical application: trim tab servo.

Lear DC motor with noise filter designed integrally into special pump base. Totally enclosed and self-ventilated. Typical application: pumps.

Gearhead DC motor. Demonstrates building block flexibility. Gearhead components are available in a variety of gear ratios for all Lear motors. Typical application: guided missile fin actuation.

DC brake motor with quick stopping and high holding torque. Optional thermal protection. Typical application: seat actuator.

Motors by the Million

...and all of aircraft quality!

Although Lear's production of electric aircraft motors impresses by its magnitude, the major emphasis is first, last, and always upon ***quality.*** It is doubtful that any other company invests as much engineering time into every motor it builds. An entire, top-calibre engineering department is devoted exclusively to motor design, making Lear exceptionally qualified to handle the more exacting and difficult applications which most manufacturers hesitate to tackle.

Lear's excellent ***facilities*** for the design, engineering, production, and testing of motors are devoted to building *aircraft* motors and aircraft motors alone. Lear motors are designed to meet every applicable military specification.

Lear has accumulated immense ***experience*** in the manufacture of motors of aircraft quality, having built over one million since 1941. All motors used on precision Lear equipment such as electro-mechanical actuators, vertical gyro indicator systems, and F-5 autopilots, are Lear motors, so they *have* to be good.

Lear is an acknowledged leader in the field of motor noise ***filtering.*** Noise filters are engineered into Lear motors at the design stage — not added as an afterthought when the product is finished — thus providing substantial savings in weight and space, and tangible bonuses in performance.

Lear motors achieved early prominence through the use of the Lear "Fastop" clutch, and are now available with a complete line of ***braking*** devices, including both AC and DC brakes of the single-disk and multiple-disk types (which incidentally, are offered as separate components to other manufacturers).

Although all Lear motors are new ***designs,*** an infinite variety of additional models are available through combination of arrangements used in our regular families of motors, of which only a small part are illustrated here. Thus, Lear-quality models can be designed, and are designed, to meet practically any specialized requirement.

If you need any kind of an aircraft electrical motor — and if you want the best — it will pay you to consult Lear. Write, wire, or phone your nearest Lear Sales Office or Lear, Inc., 110 Ionia Avenue, Grand Rapids 2, Michigan.

Gearhead DC motor. Continuous duty, air over-totally-enclosed type with single stage reduction spur gearing and built-in filter. Typical application: aircraft fuel pump.

LEAR GRAND RAPIDS DIVISION

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AF and Navy Are Still Three Years Away from Modernization

By Harry S. Baer, Jr.

WITH the Air Force aircraft inventory just past the halfway mark, and the Navy's just approaching it, U. S. military air power is still at least three years away from complete modernization.

Percentage of first-line aircraft in the AF is now just over 61%. Comparable figure for the Navy is 45%, according to the Defense Department.

From here on, however, the military will be moving at a rapid pace to modernize its equipment. By July, 1957, the AF is earmarked for a 100% modernized air arm. The Navy then should be above 90%.

Total military aircraft inventory now stands at 34,000 planes, one-third of which are jet-powered. By 1957, this figure should rise to 40,000, one-half of which should be jets.

Although the AF wing goal of 137 will not be met with aircraft deliveries for nearly three years, the AF is now engrossed in a modernization phase. It is in the market for radically advanced supersonic types to replace planes just being delivered to fill the 137-wing inventory.

How rapidly this inventory modernization progresses will depend on how fast U. S. aircraft manufacturers can develop superior aircraft, according to Roger Lewis, Assistant AF Secretary (Materiel). He said recently that the AF will be quick to buy quality-inspired types to fulfill the AF's modernization needs.

In 1957, the AF will have reached the supersonic era, operationally, in the fighter and interceptor line. An ample inventory of North American F-100's, Convair F-102's, and McDonnell F-103's will be on hand, relegating present fighters and interceptors to second-line.

By then the Boeing B-52 Stratofortress will be present at most Strategic Air Command bases, and mass production will be getting underway on the supersonic Convair B-58.

For the Navy, its operations will also have become supersonic with such carrier fighters as the Douglas F4D, Grumman F9F-9, and Chance Vought F8U, making its present-day jet fighters second-line.

How long will these new, supersonic types remain first-line aircraft? Until they are considered no longer capable of meeting successfully the military forces of potential enemies in combat, or of performing training or support missions in the manner required for successful military operations.

Thus, the determining factor in the future tenure of these aircraft will depend on what the Russians come up with in the meantime.

In the AF, the decision on when an aircraft type becomes second-line is made by a board of air staff officers in the Pentagon, designated the First- and Second-Line Aircraft Board. It reviews semiannually the capabilities of aircraft for which the AF has an operational or support responsibility. Its main functions are:

- Classifying aircraft into first- and second-line categories.
- Maintaining the currency of first- and second-line life factors.
- Authorizing disposition of excess aircraft.

More important, however, this board's work provides a basis for computing procurement and support requirements since it maintains current evaluations of the military potential and estimated useful lives of aircraft in the AF inventory.

For each aircraft type, it has calculated a period of combat usefulness, based largely on AF intelligence reports on what the Soviets have.

Recommendations of the board are submitted through the Assistant for Programing, Hq USAF, to the Deputy Chief of Staff/Operations, for approval. Approved decisions are then forwarded to the Deputy Chief of Staff/Materiel and the Deputy Chief of Staff/Comptroller, for implementation. All of these AF agencies have representation.

Officer at the heart of the Board is Col. Ernest C. Pruett, chief of the Aircraft Programing Division, Assistant for Programing, DCS/O.

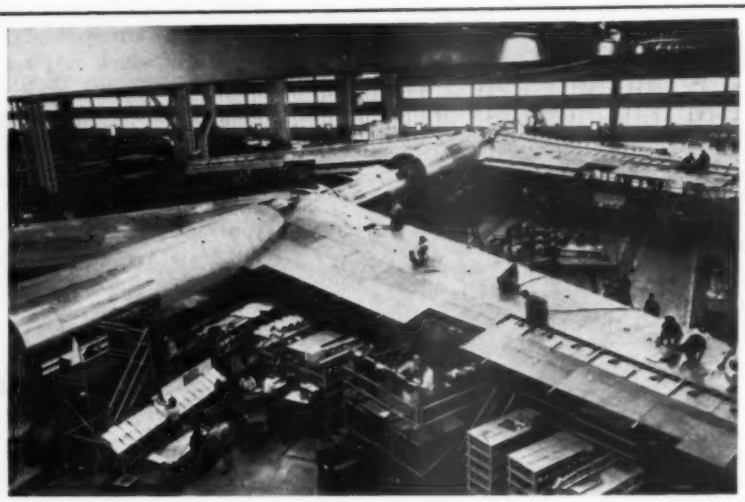
First-line life of AF fighter types is the briefest, with bombers coming next. Although trainers are first-line for much longer periods, the AF has been striving for trainers with higher capabilities to meet modernized combat training. Thus the life of a trainer from here on may not be as long as in the past. Transport aircraft first-line tenure has been calculated on somewhat of an "indefinite" basis, meaning essentially that they now have the lowest priority in the replacement picture.

The Navy's counterpart of the AF's First- and Second-Line Aircraft Board is a committee operated by the Aircraft Programs Section, Aircraft Current Programs and Budget Branch, Aviation Plans Division, Deputy Chief of Naval Operations (Air). Here Capt. Samuel R. Brown has a key role.

This committee reviews periodically the status of naval aircraft, assisting in determining future procurement requirements and deciding on when a Navy plane will revert to second-line.

Useful combat life of Navy aircraft is measured in service tours, which varies in the case of fighters from less than 20 months to more than 30 months. A service tour is generally the length of time between complete overhaul. Rule of thumb in the Navy is that a fighter or attack plane is first-line for about two service tours.

Navy patrol planes maintain the longest first-line life, followed next by anti-submarine warfare types. In the Navy, trainers are not subject to first-line classification, but instead are handled on a service life basis. Navy transports are in an indefinite category.

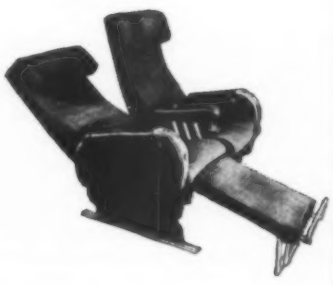


BOEING B-52 Stratofortresses for Strategic Air Command take shape in Seattle. These two planes are ready to be moved back and then to final assembly area in adjoining bay at left.

PASSENGER COMFORT ASSURES REPEAT TRAFFIC

Photograph courtesy of
Pan-American World Airways
Philadelphia, Pa.

They rode all night on an AEROTHERM Seat



MODEL 441-2

"Floating comfort" is the only way to describe the restful qualities of the Slumberyde* . . . Aerotherm's Model 441-2 Double Passenger Seat.

Luxury features include contoured back and seat of deep foam rubber with down-filled headrest. Food tray supports are an integrated part of the seat. Center armrest retracts to seat cushion line. Adjustable legrests and footrests are optional. Frame structure is of strong, lightweight aluminum and magnesium alloys for maximum seating capacity within load limits.

Seats are adaptable to a wide variety of seating arrangements. They may be mounted to floor by conventional fastenings or track mounted for easy attaching, detaching or respacing to meet daytime requirements. Back reclines to 70° as well as folds forward to a horizontal position as a safety feature.

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Interview

HOMER H. RHOADS

President, Hydro-Aire Inc., discusses . . .

Where the Accessories Industry Is Headed

HOMER H. RHOADS

Homer H. Rhoads (see cover), president of Hydro-Aire, Inc., founded the company in 1943 and has guided the company's growth from a small shop employing a dozen people to one of the country's leading accessory manufacturers employing more than 1000 people and occupying over 225,000 square feet of plant space.

Rhoads, 44, is not an engineer but has considerable interest and knowledge of engineering and has spearheaded Hydro-Aire's engineering growth. He is acknowledged a capable technical hand as well as organizer and this fall will serve as chairman of the Aircraft Accessories Sessions of the Society of Automotive Engineer's Aeronautical Meeting. He is a member of SAE, The Institute of the Aeronautical Sciences, and of various committees of the Aircraft Industries Association.

Much of his time and energy goes into travel and personal contact with the industry which he serves. He is a frequent visitor at aircraft and engine plants around the country and at airline bases around the world.

Rhoads is a native of Southern California, is married, and has two children. He is a member of the local Chamber of Commerce, the State Chamber of Commerce, the California Club, and the National Association of Manufacturers.

Q. Has the so-called Weapons System Concept, introduced in the prime aircraft manufacturing industry a year ago, proved a detriment to accessory manufacturers?

A. It is still a little too early to say. Even in this rapidly moving industry there is a tremendous time-lag between theory and practice. However, the aircraft accessories manufacturer has felt the impact of certain changes over the past six months. Whether all these changes are a result of WSC, it would be difficult to guess.

Q. What is the specific effect of the changes?

A. We have found an increasing unwillingness on the part of the prime contractor to pay research and development costs or to allow time for research and development. Competition in the aircraft equipment and accessories field is keener than it has ever been. The prime contractor wants to buy standard equipment, already fully developed at no cost to him. He wants to buy prototype units at the same price that he would eventually pay for full-production units. Yet, the specifications and requirements for this same equipment are anything but standardized.

Thus the equipment manufacturer is asked to gamble on the future of a given project. He is asked to carry a large share of research and development costs since he must deliver a prototype at a price that covers only a fraction of the cost. If the weapon on which this unit is installed goes into full production, he must again bid competitively against a dozen other manufacturers for the production order. If the weapon does not go into production, his investment is lost.

Q. Does this attitude actually affect the quality of the end product?

A. To some extent, yes. The industry has become more price-conscious. Our customers are less willing to pay premiums for advanced design, lighter weight, space savings, etc. Certainly, the equipment must meet the specifications as set forth by the armed forces and the prime contractor. But the incentive to go beyond these requirements seems to be failing.

Q. Does this trend threaten the basic structure of the accessories industry?

A. We are not saying that these changes indicate permanent trends. Certainly—even if that is the case—we do not contend that such trends would necessarily be detrimental to the aircraft accessories and equipment manufacturers. However, it looks like a battle has started . . . and only the fittest will survive. Those equipment companies that are strong enough to carry on independent research and development, that can come up with new products to meet future needs, will profit in the long run. But it's going to be a hard pull, and there are many financial risks involved.

Q. Does this problem affect both large and small companies to the same degree?

A. Right now, the large manufacturer who carries a heavy research and development load is at a definite disadvantage against the small "job shop." At Hydro-Aire, we started out in 1943 as one of these shops. Today, we are carrying a research and development load in such categories as pumps, turbo-machinery, and electronics. Almost 20 percent of our employees are in the engineering division. We are developing many proprietary products—with our own funds—to meet future needs of the aviation industry. The

"The industry has become more price-conscious . . . customers are less willing to pay premiums for advanced design"

costs of these developments are high and, in many cases, the fruition of the developments is still far in the future. Competition is basically healthy, but it should be practiced with some uniformity throughout the industry. Today, that is not always the case.

Q. What part of the accessory business do you feel is now covered by contracts working under this (the Weapons System) concept?

A. Several prime contracts have been awarded along the lines of the Weapons System Concept—the best example being the contract awarded by the Air Force to Convair for the B-58 project. It would be difficult to say how much of the accessory manufacturing industry's present work is covered by subcontracts under WSC.

Your question implies that you regard the WSC as a new and radically different concept in defense purchasing. WSC is a statement of a trend that has been progressing for more than 10 years: clearer delegation of authority to the prime contractor and a more businesslike treatment of buying our defense weapons.

WSC recognizes that the know-how and experience in the construction of a weapon rests primarily with the prime contractor. It demands from him the maximum in knowledge and experience and, in return, gives him vastly more authority and discretion than he has ever had before. As a basic theory, there can be very little argument with the WSC. The difficulty lies in how the prime contractor chooses to carry out this responsibility and how he exercises his newly won authority. If the theory is carried out well, it will put the entire industry on a more businesslike footing . . . and it is bound to grow.

'. . . more authority for subcontractors'

Q. Is there any sign of the prime Weapons Systems contractors extending this type of planning to the accessory manufacturers?

A. It's a little too early to tell just how the prime contractor will carry out his authority under WSC. It is just plain good business sense that the prime contractor—vested with this new authority—should, in turn, give greater authority to those subcontractors who are mature enough to carry the responsibility.

Ten years ago, the airframe manufacturer carried almost the complete design and development burden for aircraft accessories. The operation of the accessories manufacturer consisted of building valves, actuators, and other components to the airframe company's blueprints. Development testing was either carried on by the airframe company or at their complete expense.

But the equipment manufacturers grew rapidly during World War II. Large commercial firms—like our own parent organization, Crane Co.—entered the aircraft accessories field. Aided by government funds and equipment, private capital played a major role in the expansion of the aircraft accessories industry. Accessories companies became specialists in their various categories and acquired a vast amount of know-how in design, research, and development.

Accessories firms began to shoulder the burden of solving a large share of aviation problems. A small group of mature manufacturers launched extensive research and development programs—financed by private capital. On paper, the equipment manufacturer was and still is a subcontractor. But he is no longer a subcontractor in the sense that he manufactures to the designs of the prime contractor. Hydro-Aire's fuel pump program is a good example of this new thinking. Our company spent more than three years—and several hundred thousand dollars—to develop a new fuel pump of advanced design. Not until our basic research and development was successfully completed, did we attempt to solicit orders for the pumps.

Q. Is the average accessory manufacturer capable of doing, for instance, a fuel systems engineering job?

A. No . . . not the average. Several elements are required in an organization to take on such a contract. It must be an accessory firm with experience in designing and manufacturing a wide range of fuel system components. Because a company manufactures a good gate valve, for example, is no reason to presume that it has the know-how to design a good fuel pump. There is a small group of accessory firms, however, which has experience in virtually all the components of a fuel system. These companies have adequate laboratory facilities to test and develop a complete system.

Finally, experience in components and testing facilities doesn't necessarily mean that the firm has the know-how in systems engineering. Many of the present components designers are former systems engineers. Some of our own people, for example, were project engineers and assistant project engineers with airframe companies prior to joining Hydro-Aire. These people represent the "cream-of-the-crop" when it comes to fuel systems engineering. Today, their full talents are not always utilized in the accessory business.

Q. How does this approach compare with today's method of doing business?

A. Today, the prime contractor buys his fuel system on "the open market." Company "A" makes a gate valve; company "B" designs a fuel filter; company "C" supplies a pump. In view of the fast growth of the accessory business, it is understandable that the prime contractor should be hesitant to put all his eggs in one basket. And yet the advantages should be obvious: greater efficiency of design, less liaison work, less waste of manpower on coordination, etc.

'. . . a share of the responsibility'

Q. Doesn't this indicate that the accessory manufacturers have reached a stature not generally realized?

A. The term "accessory manufacturers" encompasses such a vast group of companies that it is impossible to define the stature of the whole group. There is a group of mature aircraft equipment and accessory manufacturers whose contribution to the aviation industry is definitely important. This group shares the civic and national responsibilities of aviation through participation in such organizations as the Aircraft Industry Association. Since many of tomorrow's aviation problems must be solved in terms of equipment,

Interview from page 39

"... in terms of design and materials, this industry is perhaps 20 years or more ahead of the commercial field"

this group shares a large part of the burden for future planning and development.

While the large share of this group's business is in the form of subcontracts, all of them are also prime contractors in one or another phase of their operation. Hydro-Aire, for example, holds such contracts as a study program on air transformers for Wright Air Development Center. To some extent, therefore, these manufacturers are gaining the right stature in the industry.

Q. How do you feel that industry recognition of this maturity could be used to better advantage?

A. Even this group of large and mature accessory companies does not hold enough responsibility in the planning of a Weapons System. WSC throws all the responsibility in the lap of the prime contractor—in most instances, an airframe manufacturer. If it develops that the airframe manufacturer goes back to the old system of developing and designing his own accessories, a tremendous segment of our industry will be wasted. We hope that the trend will continue in the opposite direction—that the aviation industry will eventually turn the accessories manufacturer from a "junior" executive into an even partner.

Q. To what extent do the research and development funds of the accessory manufacturer come from profits rather than from direct military contracts?

A. By and large, especially in recent years, the research and development funds of the accessory manufacturers have come from profits or from investment of private capital. Proprietary products—pumps, valves, actuators, and so on—have been developed by the accessory firms at their own cost. Like any other businessman, the accessory manufacturer must try to amortize his research and development. He tries to get the money from his customers by charging for new designs, building of prototypes, etc. Thus, it may be argued by some that the government is indirectly or directly paying for all accessory R&D. Actually, this is not the case. Today, the accessory manufacturer can only recoup his R&D investment on a quantity order. He cannot make up that investment on the sale of the prototype or even on a short production run.

'... a step toward standardization'

Q. Could you give us an idea how greater design responsibility on the part of the accessory manufacturer might contribute to equipment standardization?

A. Greater design responsibility—such as the complete fuel system contracts discussed before—wouldn't bring on equipment standardization. But it would certainly be a step in the right direction. The accessory manufacturer would use the same or similar components in different systems wherever he could do so without compromising stringent requirements. At the present stage of aircraft and missile design, standardization is obviously an impossibility. It would at least be possible, however, to achieve compatibility in a line of system components—which would eventually lead to standardization.

Standardization—if and when it comes about—will be the result of compromise and organization. Certainly the accessory manufacturer is in an excellent position to work toward this goal—if he is given sufficient design responsibility.

Q. How much does it cost to develop a typical valve, fuel pump, or turbine assembly?

A. The range of development costs is so varied that it is almost impossible to give you any definite figures. Hydro-Aire has developed single valves for as little as five or six thousand dollars. Where major problems—such as brand-new requirements—had to be overcome, the costs sometimes run into hundreds of thousands. Our research and development costs on the new HY-V/L pumps ran close to $750,000. The development of air-cycle machinery—such as a complete pressurization or accessory-drive system—may run into several millions.

Q. Is the current trend toward general industrial companies, such as Crane Co., buying into aircraft accessory manufacturing, a sign of the industry's inherent inability to match capital requirements with funds?

A. It is certainly true that—over the past four or five years—many big general industrial companies have gone into the aircraft accessories field. Some of them have done so by starting their own aircraft divisions and manning them with people experienced in the aviation field. Others—like Crane Co.—have acquired independent aircraft accessory firms and are channeling their aircraft business through these subsidiaries.

This has brought greater financial stability to the aircraft accessory business—and is certainly healthy. It has also brought about a very healthy exchange of methods, processes, and general "know-how" between the large industrial firms and the aircraft accessory companies. In terms of research and development, use of advanced materials, and design, this industry is perhaps 20 years or more ahead of the commercial field. But in terms of mass-production techniques, organization, and just plain sound business principles, there are many things that this industry can learn from older and more experienced hands.

'... you need a broad base of interest'

Q. Is specialization one of your problems? Would you give us an idea how Hydro-Aire's business is divided among its many products?

A. Specialization is a problem to this extent: We can't afford to specialize in any one or two product categories. Naturally, we employ engineers, research scientists, production experts, and so forth, who do specialize in a very limited phase of the accessory business. But—as a company—we must seek to maintain a well-rounded balance. The only certainty in this business is the certainty of change. Yesterday the accent was on hydraulics. Today it is on pneumatics. Tomorrow, the field of electronics may control the entire system of a weapon. Each time a major trend changes, a whole group of "specialized" accessory firms are in danger of being wiped out. To move with these trends, you must have a broad base of interest: hydraulics, pneumatics, fuel system, electronics, etc. And you must be willing to back this interest with research and development directed toward solving future problems.

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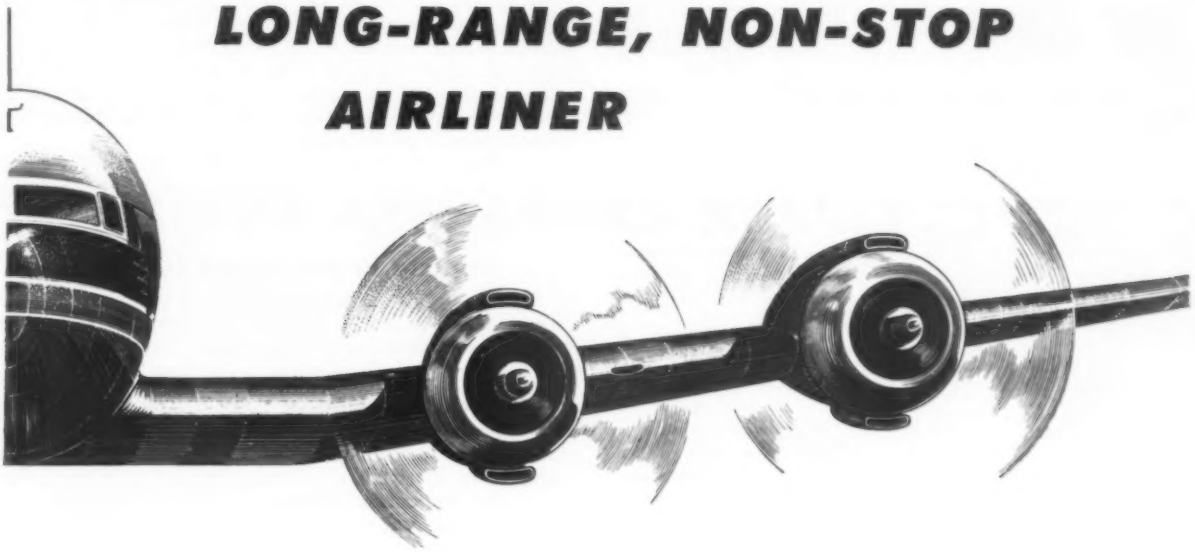

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DOUGLAS

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Interview from page 40

"Our aim should be to work toward an equal partnership with engine and airframe manufacturers . . . "

Q. Is Hydro-Aire doing much with jet engine accessories?

A. Jet engine accessories have become one of our most important product categories during the last three years. In this highly complex category, Hydro-Aire has pioneered in many new uses of materials and production techniques. Our large line of hot-air valves is a good example.

Q. What progress have you made in the turbine field?

A. We entered this field almost two years ago and obtained our first contract for a combination accessory-drive and air-conditioning system on a supersonic jet fighter. This system—known as the "Frijadrive"—has been completely developed. We have also developed a new accessory-drive turbine that is presently being used in connection with our fuel pump. We also have a study contract with Wright Field in this category.

Q. What is the status of your Hytrol anti-skid braking system?

A. Hytrol is being used or tested by more than 25 different types of aircraft. It is a production item on the B-47 and the B-52, and has been installed on Northwest Airlines' fleet of Stratocruisers for more than three years. Virtually every other major airline is testing or considering the advantages of Hytrol.

Q. To what extent is Hydro-Aire in electronics activity?

A. We entered the advanced field of electronics about two years ago as a manufacturer of transistors. Today, we are developing a number of transistorized components for the industry, and our work in this field is leading us into several other categories. We have engaged a staff of scientists and engineers to help us plan for the future in electronics.

'. . . diversified in aviation only'

Q. Is this part of a general effort toward greater diversification?

A. In our industry the word "diversification" is generally interpreted to mean a move into non-aircraft categories. That type of diversification may become a side-product or our program, but it is not its major objective. It seems to have become fashionable to talk about the aviation industry as some sort of a passing fancy. The "smart talk" in the industry today seems to be along the lines of building better lawn-mowers and lighter pot handles. I believe that this sort of thinking displays a lack of faith in the future of aviation.

Hydro-Aire is a diversified aircraft company . . . with the accent on *aircraft*. Through diversification, we hope to continue our policy of working with the airframe manufacturer, the engine manufacturer, the airlines—and everyone else in aviation—to make this a bigger and better industry.

Q. Where do you feel the greatest room for expansion of your accessory business lies?

A. Our aim should be to work toward an equal partnership with the airframe and engine manufacturers in building the aircraft of the future: a two-way proposition. The accessory manufacturer must be willing to shoulder an ever-increasing burden in terms of research and development. He must think in terms of the benefits to aviation, rather than in terms of his own more limited sphere. In return, the industry must recognize and utilize the accessory manufacturer's greater stature.

The guided missile field represents an excellent opportunity for the accessory manufacturer to share the problems of the airframe manufacturer.

'. . . expand in the missile field'

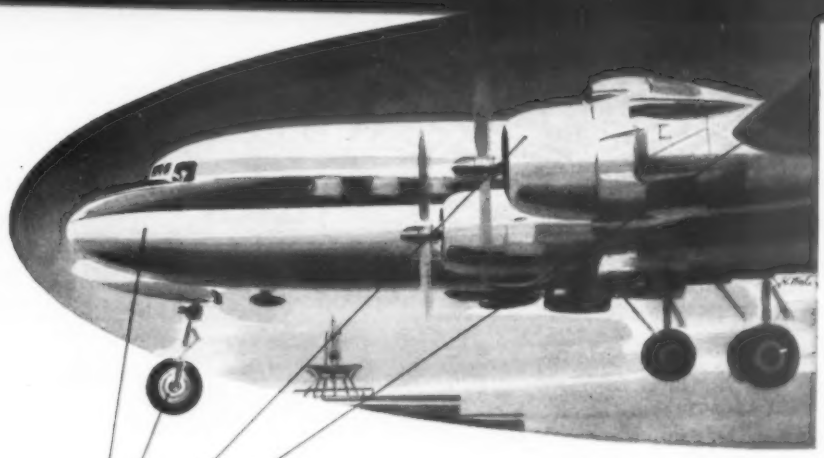
Q. Have missile developments presented any special problems or challenges to the accessory manufacturer?

A. A book could be written on accessory industry problems with respect to the guided missile field. Due to the security wraps on most missile projects, and due to the radically new components that are needed for missiles, the prime contractors for these weapons have generally done much less subcontracting than previously. This policy has worked to the detriment not only of the accessory firms, but the whole aviation industry.

Very simply, it means that a large segment of industry know-how and facilities are not being used in the development of this new vital form of air power. Also, in cases where subcontracts for components have been let, these components have often been turned out to the design of the prime contractor. The accessory firm with a good engineering staff and research facilities is thus forced to revert to the role of a job shop. In this capacity, the mature accessory manufacturer finds it difficult to compete price-wise, since he cannot amortize his research and development overhead.

Thus, a great deal of missile subcontracting has actually gone to smaller firms which do not have these facilities. In cases where an accessory manufacturer has been asked to bid on guided missile components, security regulations have often made it impossible for the manufacturer to get enough information to adequately solve the problem. Here, again, the accessory company is unable to use its full brainpower on the project. Another aspect is that of low missile production. In the manufacture of prototype units—especially to the design of the prime contractor—the small shop can often give faster delivery and a lower price. The prime contractor is often forced to award a contract on this basis. When a missile goes into mass production and these same components are needed in much larger quantity, the small shop will not be able to meet the demand . . . at least not at competitive prices with a large production organization. Therefore, the apparent savings disappear in the long run.

In spite of such problems, Hydro-Aire is manufacturing a wide range of highly specialized units for guided missiles. We will continue to expand our business in the guided missile field. In view of what I have said before, I think you can readily understand that we can hardly afford *not* to do so. • • •



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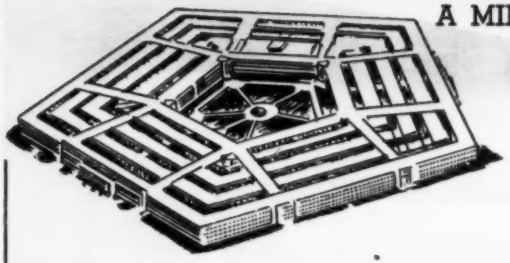
A MILITARY COMMENTARY

By Harry S. Baer, Jr.



Government Wind Tunnels ... Should Industry Pay to Use Them?

HERE'S a switch.

The aircraft industry wants to pay the government for use of its multi-million dollar wind tunnel facilities —but the government insists on operating them on a non-fee basis.

This fiscal problem has undergone a great deal of study by industry, the Air Force, NACA, and other interested agencies. It is now in the hands of Donald A. Quarles, Assistant Defense Secretary (Research and Development), who already has decided that a fee system is out for the present. Quarles, however, is keeping an open mind on the subject.

He's mulling over the possibility of crediting manufacturers who use their own research facilities or who contract to use outside facilities. With this idea, an appropriate monetary credit would be allowed in the award of a contract. If it materializes, it may accomplish an important objective for industry in lieu of an all-out fee system.

Aircraft Industries Association last year took a firm stand that such facilities should be operated on a fee basis.

"With the contemplated early operation for industry development purposes of the wind tunnel and associated test facilities at the Arnold Engineering Development Center, Tullahoma, Tenn., the aircraft industry wishes to advise you of its strong conviction that these facilities should be operated on a fee, rather than non-fee, basis," DeWitt C. Ramsey, AIA president, wrote AF Secretary Harold E. Talbott in February 1953.

AIA's Eight Reasons

The letter listed eight AIA reasons for support of the fee system. They include:

(1) More efficient operation of test facilities maintained by keeping the tunnel staff and industry continually conscious of the high cost of wasted time.

(2) Scheduling kept on a first-come, first-served basis, with preference given to those who failed to make the last scheduling period.

(3) Insurance that tests requested actually require the speed ranges, power requirements, accuracy, and instrumentation available.

(4) Greater manufacturers' control of the test program.

(5) Keeping existing commercial laboratories free from being jeopardized, or forced to curtail operation, because of non-fee government facilities.

(6) Precedent of the Bureau of Standards fee system, which consists of two different procedures for disposing of the money involved.

(7) Lack of proper cost accounting when all or any part of a development is accomplished without charge in government facilities.

(8) Criteria of facility usefulness available with a fee system, which would provide a more positive indication of a facility's actual value to industry.

This AIA stand, which holds firm today, met considerable opposition in some parts of the AF. The reasoning is that if fees were paid by industry, the amounts would be charged to the AF in the aviation industry's research and development contracts.

Principal AF worry in this rather circuitous fiscal operation is that the fee money involved might be short circuited; that is, it may be deducted from overall AF research and development funds, reverting to the U. S. Treasury.

Another point of contention, of course, is the matter of control—industry vs. military. Some AF officials express fear of losing military control under the fee system, although it is difficult to see how the military (holding the purse strings) could ever lose the upper hand. Ramsey expressed a need for manufacturers' control of test programs in this fashion:

"In all government owned and operated facilities using a non-fee system, the manufacturers find that their test programs are too much under the control of the government agency. There is a tendency on the part of the latter to attempt to establish the nature, extent, and sequence of the test program even though the manufacturer has firmly fixed those factors based on research data needed for his particular design."

Quarles' office in the Pentagon is currently working on the formation of a coordinating committee to study the fiscal, budgetary, and public works aspects of large ranges, wind tunnels, and centralized government-owned engine test facilities. In addition, Quarles has called for the military departments and NACA to organize two joint committees to coordinate the allocation of defense projects and to assign priorities for development tests to be conducted in such facilities.

Defense Department's Stand

Present Defense Department stand is best expressed in a recent paper which came from Quarles' office. It states:

"Until a solution can be found for the practical problems in the way of a dollar-type operator-user relationship which would control the complicated work load vs. operating level relationships, the operation of wind tunnels, engine test facilities, ranges, and other large test facilities should be controlled, planned, and financially supported on a facility or installation basis, with the work load scheduled and performed on a priority and technical feasibility basis."

Quarles wrote Ramsey on July 29 presenting these up-to-date details. In his letter, he stated that manufacturers' competitive bids affected by the cost of purchasing time in privately owned wind tunnels or from operating their own wind tunnels would be given full recognition.

Regarding AIA's recommendation for an all-out fee system, Quarles said, "We plan to continue to study the problem and to seek a method by which a fee system could be inaugurated at an appropriate future time and to the advantage of all concerned." • • •

Handling of 1955 Federal Airport

not be obligated for the complete project. Wherever possible, federal

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Handling of 1955 Federal Airport Money is Key to Future Aid

By Lois C. Philmus

CONTINUATION by the federal government of its obligation under the Federal Airport Act to expend $500 million on airport aid by fiscal 1958 is greatly dependent on the programing and administration of the token $22 million appropriation for fiscal 1955.

Both the Senate and House committees made it clear during hearings that the appropriation was being approved for two reasons: (1) because of community bond obligations, and (2) to keep a program going until some sort of satisfactory re-evaluation could be worked out.

Congress was particularly upset over the attempted change in emphasis by the Department of Commerce. The request for a boost in the discretionary fund from 25% to 50% was completely ignored. The change to an eligibility of "national interest" criteria brought forth a reminder from Rep. Carl Hinshaw that the airport act was conceived to encourage and develop general aviation. The third change, to eliminate terminal buildings from federal financing, actually was generally agreed to by most interested parties and was recommended by the industry study group called together last year by Under Secretary of Commerce Robert B. Murray.

Actually, the latter two amendments do not need Congressional approval within the broad interpretation of the Act. The CAA Administrator can use his discretion on where to put the money. One gimmick, however, appears in the 1955 programing planning standards. Not only were terminal buildings eliminated from eligibility, but all buildings were thrown out of the program. This eliminates such non-revenue buildings as control towers, fire stations, power houses, etc., contrary to industry recommendations.

Two major issues are forming over the building situation:

(1) ATA is likely to join with airport officials in demanding reinstatement of control towers. Prevalent feeling is that the federal government should participate in all operational aspects of airports. Control towers fall into this category and are important safety factors.

(2) In excluding terminal buildings, Commerce has ignored a corallary inserted into the industry study group report which states "all federal agencies should pay for all their space requirements including cost of construction and maintenance, on a self-liquidating basis" in lieu of federal participation in construction of the entire building.

What effect pressure on these two issues will have on the new program should be seen soon. CAA has completed drafting its recommended program for allocation of the $15 million (available out of the $22 million—American Aviation, Aug. 30, p. 27.) to the states, and it has been sent to Commerce for approval.

Operating under the handicap of trying to "stretch" $15 million to its maximum effectiveness, CAA's Office of Airports set up its recommended program under the following standards:

Basic eligibility requirement calls for 3000 enplane passengers annually, or 30 base aircraft, or suitable combinations. Aeronautical demand modifiers to this basic criteria include: (1) consideration of all factors which can't be measured by the criteria; (2) adjustment of seasonal peak traffic; (3) possible need for alternative or provisional airports in areas which can justify a higher service type; (4) high itinerant aircraft activity comparable to fields with 30 based aircraft; (5) fields where based aircraft combined with airworthy aircraft are dependent on primary base for repairs and service.

New airports will be considered if: (1) present or future air traffic volume exceeds potential capacity of existing airport; (2) existing airport cannot be improved satisfactorily; or (3) if one new airport can serve more than one community more efficiently than two or more existing facilities.

Stage construction is not encouraged under the new standards but, if undertaken, the sponsor agreement is to make clear that the federal government will not be obligated for the complete project. Wherever possible, federal money should be used for actual construction and not for engineering and administrative costs.

Everyone concerned hopes the trial period works out satisfactorily. The government hasn't even neared the halfway mark in expenditures under the Act. Before the fiscal 1954 moratorium on the program, Congress had appropriated $214,221,154 from 1947 through 1953. Administrative expenses accounted for $20,191,482, leaving a balance of $194,029,672 for projects allocation. State apportionment was $134,812,727.25, discretionary fund, $52,724,272.75, and U.S. territory projects, $6,492,672.

As of June 30, 1954, CAA had obligated $191,883,819 (see table). The balance of $2,145,853 was frozen by Commerce during the moratorium year with $1,500,000 diverted to CAA administrative funds. The remaining $645,853 will be programed in the $22 million project.

An idea of what's at stake this year can be seen in the fact that there is a total of $120 million on hand in local funds for matching appropriations. Of this, more than $30 million is on hand in 38 communities from sale of airport bonds, use of which is contingent on matching funds and on which interest is being paid. Twenty communities have approved bond issues of about $72,000,000, pending federal funds, and an additional 221 communities are holding about $18 million out of general funds earmarked for airport development, based on matching federal funds.

The $15 million, plus $5 million discretionary fund for priority situations, is a drop in the well-known bucket. But it can mean the continuance of a much-needed program to many communities if handled to Congress' satisfaction in the next year. • • •

FEDERAL AIRPORT MONEY . . . the 8-Year Program

CAA Region	Total Grant Agreements			Total Construction Started		Total Construction Completed			Financially Completed		
	Number		Amount (add 000)	Number	Amount (add 000)	Number		Amount (add 000)	Number		Amount (add 000)
	Projects	Airports		Projects		Projects	Airports		Projects	Airports	
I	382	162	53,075	380	52,960	352	156	48,377	296	147	33,632
II	591	286	42,942	587	42,110	550	273	40,263	475	255	27,752
III	740	394	52,834	737	52,768	708	388	43,722	554	336	30,875
IV	699	297	36,626	699	36,626	677	292	35,819	624	282	28,465
U. S. Totals	2412	1139	185,478	2403	184,465	2287	1109	168,181	1949	1020	120,723
Alaska	32	31	1,782	32	1,782	30	29	1,463	17	17	644
Hawaii	15	7	1,874	14	1,724	14	7	1,724	5	3	776
Puerto Rico	7	1	2,540	7	2,540	6	1	2,040	5	1	1,940
Virgin Islands	7	2	210	6	195	5	2	161	4	2	149
Terr. Totals	61	41	6,406	59	6,240	55	39	5,389	31	23	3,509
U. S. and Terr. Totals	2473	1180	191,884	2462	190,706	2342	1148	173,570	1980	1043	124,232

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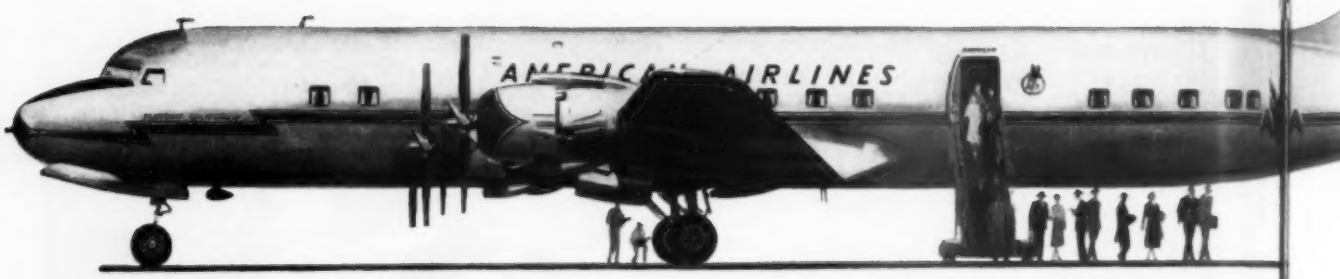

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THE DC-6A

The introduction of the DC-6A, largest, fastest cargo plane in operation today, enables American Airlines to offer customers next-morning delivery on east to west coast shipments. American, both pioneer and pace setter in the air freight field, has 3 DC-6A and 9 DC-4 Airfreighters at the service of shippers throughout the country.

THE FLYING-BOAT . . .

. . . where does it fit in the future?

The Navy and some U. S. manufacturers think it will gain favor in the jet age

Marines debark from a Navy R3Y-2 Tradewind, world's first production turboprop flying-boat. The R3Y-1 (in left background) has conventional loading doors.

By ANTHONY VANDYK

TO the perennial question, "Is the flying-boat coming back?" there is a simple answer—"It never went away." Hundreds of water-based aircraft are in commercial and military service the world over.

Answering the question, "Is the flying-boat likely to regain its one-time predominance in the aviation field?" is more difficult.

Prime sponsor of water-based aircraft today is the U. S. Navy, and its optimism is reflected in the recent words of Under Secretary of the Navy James Smith who said: "Remove the propellers on seaplanes and they become very attractive." He pointed up the basic reason why the future of the flying-boat looks so bright today.

Why has the advent of the jet engine had such a profound effect on the future of the flying-boat? George Trimble, just been named head of The Glenn L. Martin Company's Advanced Design Division, explained it this way to AMERICAN AVIATION: "We no longer have to compromise the airborne mission with structural and aerodynamic drag-producing items that keep propellers clear of the water during takeoff and landing. By combining this happy circumstance with the hull development work that has been carried out, one obtains a seaplane which appears in a favorable light compared with other types of aircraft by whatever yardstick you choose to evaluate them."

Britain's Saunders-Roe company is sole European manufacturer still developing big flying-boats. Photo shows new design undergoing tank tests.

Although the No. 1 customer for the flying-boat is likely to remain the military, manufacturers of water-based aircraft are starting campaigns to interest commercial operators in reverting to the flying-boat. J. W. Sweetser, Martin's vice-president (sales), is currently winding up a round-the-world tour during which he discussed with airlines the possibility of a commercial version of the P6M delta-wing, jet-powered flying-boat. Convair has had informal talks with operators on the advantages a commercial version of the turboprop R3Y military water-based transport would offer.

Speed now possible

Ernest G. Stout, Convair's top flying-boat man, explains his belief that the water-based commercial transport is on its way back in the following terms: "Water-based air transport ruled the world's lanes of aerial commerce for years, due to the ability to provide unmatched economy, comfort, versatility, dependability, and, above all, safety. Lacking one essential ingredient—speed—these other inherent qualities were compromised in favor of the faster landplane. Development of the high-speed blended hull has made possible a water-based turbine transport that meets the requirements of modern commercial aircraft speed without compromise to any of the established inherent advantages of water-basing."

The enthusiasm of Convair and Martin is echoed on the other side of the Atlantic by Saunders-Roe Ltd., only European company still actively engaged in the development of big flying-boats. The British manufacturer's enthusiasm, however, is not warranted by the British government's present attitude toward water-based aircraft. The British Air Secretary recently summed it up in these words: "At the moment we do not see that the landplane cannot do what is claimed for the seaplane and do it more economically."

It is this thinking that has resulted in the cocooning of the 140-ton Princess turboprop-powered flying-boats and in the lack of British appropriations for the development of water-based aircraft. British commercial operators are not so pessimistic as the military, however. BOAC has stated that it would be interested in operating the Princess while Aquila Airways, Britain's only remaining flying-boat operator, has offered to buy the three boats outright.

Aquila, an independent operator, specializes in services to points which by their physical nature cannot be served by landplanes. Typical operations are those to Madeira and Capri. The only other European all-flying-boat operator is France-Hydro which has a few six-engine Latecoere 631's. These big planes are currently used to haul supplies in French Equatorial Africa. The handful of commercial operators throughout world and their outmoded equipment point up the decline in interest in water-based aircraft since World War II (prior to which almost every major international airline had flying-boats as an important element of its fleet).

Main reason for this was the con-

Britain's lack of support for the flying-boat led to cocooning of the three 10-engine Saunders-Roe Princesses. Only one had been flight tested.

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Branch T. Dykes, President of Colonial Airlines, commenting on his company's safety record says, "We will do our best to continue to merit the use of our slogan, 'Safety is no accident', for a long time to come."

A few weeks ago, Colonial Airlines began its 25th year of operation, and set a new all-time air safety record — the truly remarkable record above, which exemplifies the safety standards being established throughout the airline industry.

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struction during World War II of innumerable airfields all over the world which opened to landplanes main points hitherto accessible only to flying-boats. Furthermore, development of flying-boats suitable for commercial operation during the war was not pushed to the extent that transport landplanes were developed. These two factors meant that at the end of the war the number of flying-boat operators was far less than at the beginning and that these companies had therefore to assume higher costs in keeping their bases in operation.

The prohibitively high cost of operating bases was the main reason why BOAC reluctantly suspended flying-boat services a few years after the war.

Bases no longer a problem

Thanks to military sponsorship, however, bases for flying-boats are no longer an expensive problem. Mobile bases costing relatively little are now available and considerable effort has been concentrated on the development of water-handling facilities so that the flying-boat need rarely be beached. Due to these factors, water-based aircraft are becoming increasingly attractive to the U. S. Navy's planners, particularly now that modern flying-boats can operate in extremely rough waters.

Although the prime role of the flying-boat in the U. S. Navy will continue to be that of patrol bombing, there is growing awareness that water-based aircraft are essential for logistic support of mobile fleets in time of war. The dependence of large landplane transports on highly vulnerable runways has pointed up the flying-boat's ability to operate from the ready-made and indestructible runways of the world's seas, lakes, and rivers. These considerations have also led to the development of water-based fighters. By means of hydroski the fighter-flying-boat can operate from rough water with no trouble (recent tests with the Convair XF2Y-1 Sea Dart proved this).

Could carry nuclear power

Apart from all other reasons, the advent of nuclear power has guaranteed the flying-boat a continuing important role in aviation. Requiring heavy shielding, the nuclear powerplant will be of such weight that the aircraft it powers will require tremendous take-off and landing runs, and runways of huge weight-bearing capacity. The cost of constructing such strips would be almost prohibitive.

In fact, their construction will not be necessary due to the availability of the limitless, ready-made, bomb-proof runways of the sea. • • •

West Coast Talk . . . By Fred S. Hunter

- **What a plane—the A4D!**
- **AF wants 'em to fly faster and higher**
- **Who'll be the 717's second source?**

Navy is reported to like what it's seen of the Douglas A4D and has ordered few changes. Of course, the A4D is a pretty small airplane; not much room to be adding things or making changes where space is involved. Only change we've actually heard of is a bulletproof windshield. Reports from Edwards AFB say flight tests are coming along fine and the ship looks like it will be a little gem. They also relate they have to use two F-86's for chase planes because the lightweight, low-drag A4D runs one chase plane out of fuel.

• •

The Air Force has never come out with a GOR (government operational requirement) for a lightweight fighter and the sort of informal competition that seems to have developed between Lockheed, North American, Northrop, and Republic leaves the numbers wide open. A future engine which appears to be highly regarded on all sides is GE's forthcoming J79 with such attractions as low frontal area, high pressures, and low specifics. It uses a single-spool method which makes it suitable for the lightweight category.

• •

Lockheed is programing for a powerplant of higher thrust for a possible production F-104. Same goes for North American's Rapier and Northrop's Fang. Not that Lockheed is unhappy about the experimental XF-104's Wright J65. Tony LeVier, Lockheed's chief engineering test pilot, who has been doing most of the test flying on the XF-104, has only kind words for the engine. But the Air Force keeps wanting airplanes that fly a little faster and a little higher, and the manufacturers aim to please.

• •

Hughes Aircraft test pilots tackle their heaviest program to date with the flight testing of the Hughes fire-control system in Convair's F-102 delta wing interceptor. The first two F-102's are being checked in at Culver City this month for installation of the equipment and instrumentation. Other planes are to follow. The project will be a long one and it will be a year, possibly, before actual firing phases of the Falcon missile (also made by Hughes) take place. Meanwhile, Convair will be making dummy firing tests without the fire control to determine stability of the platform. Col. Clarence Shoop, once commanding officer at Muroc, directs aircraft operations and flight test for Hughes. Bob DeHaven is chief of experimental flight test. They'll carry the brunt of the new project.

• •

Jack O'Brien says AiResearch Aircraft Service can install a practical executive interior in a Convair 340 for as little as $30,000. But the orders average more nearly $150,000. Buyers of corporate aircraft are like bottle blondes . . . they have their own ideas about trim lines and colors and a strictly standard job has little appeal. AiResearch has a 15-man engineering staff which is big for such a company, but, says O'Brien, "nobody can stump us."

• •

Speculation already is starting on who'll get the Air Force nod as second source for the Boeing 717 jet tanker . . . Its Schwien division, which produces the gyros, makes Wm. R. Whittaker Co. a subcontractor on the Nike . . . American Helicopter is scheduling delivery of XH-26's to the Army by late fall . . . First six or seven B/RB-66's will go to Edwards AFB before Douglas starts sending the twin-jet AF bombers to the flight test base the company is establishing at Tucson.

• •

You can still pick up an R-1830 for less than it costs to overhaul one, but they're getting tighter and the big supplies are fading. Some recent quotations ran about $1,900 for R-1830-43's and 65's, $2,100 more for 90B's, and $2,700 for 92's.

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New Ignition System and Distributor Design Revealed by Bendix

First ignition conference promises another round of piston engine improvements

By Joseph S. Murphy

SIDNEY, N. Y.—With all due regard for the fast-approaching wide-scale operation of jet transports, it still looks like a good bet that the airlines and military services have not seen the last of major design improvements in ignition systems of today's piston-engine aircraft.

At least this was the promise held forth here early this month as the Scintilla Division of Bendix Aviation Corp. sponsored the First International Ignition Conference. On hand at the three-day session were close to 70 representatives of foreign and domestic airlines, military services, and engine and spark plug manufacturers.

Highlighting the past year's progress in correcting service problems in current systems, Scintilla's top service engineer, H. C. Welch, unveiled these major design projects, both still in the "breadboard" stage of development:

- A new distributor design for current low-tension ignition systems which entirely eliminates the troublesome carbon brush-segment plate combination in distributing magneto voltage to the cylinder transformer coils.
- A completely new ignition system, presumably based on experience gained at Scintilla in developing jet ignition, which could be used with present types of spark plugs.

Although purposely withholding details of the design of both developments, Welch did indicate that the proposed distributor action was completely electrical, but that it uses no wiping contacts whatever. Although its principle of operation presents some electrical losses to the ignition system, he said they appear to be quite small.

Is there interest?

Still to be investigated, however, are a number of other critical points. Nonetheless, Scintilla is moving ahead with prototype manufacture of complete distributors for laboratory testing and, if successful, plans to build complete engine systems for further tests.

As to the design of the new ignition system, Welch confined his remarks to the mention of successful operation to date on a single-cylinder engine in the laboratory and of plans for further engine testing with a development model now being fabricated. The one big factor of concern to Scintilla in pushing this development of a completely new ignition system at this time seems to be one of questionable customer interest in any major modification to piston engines with the prospect of jet operation so relatively close at hand.

As a result the project is being carried out without a particular priority so that its development effort will not interfere with other more pressing problems, yet at a pace sufficient to insure that the system, if successful in testing, will be available if a market does develop.

As to current ignition system problems, discussion at the session ranged from such chronic items as distributor carbon brush wear to the less significant need for a change in name-plate location on a particular system component. One of the most intensive investigations underway at Scintilla and probably the key item of interest concerned the distributor carbon brush operation.

In continuous testing over the past 18 months and involving some 144,154 hours of operation of 10 P&W R-4360, six R-2800, and two R-3350 distributors, Scintilla reported best results in correcting erratic segment plate burning with a new coil spring or "mouse-trap" type of distributor finger used with a combination of E-112HH carbon brush and graphitized plate finish. The continuing program has not, however, achieved its goal—a 2000-hour or full-engine-run distributor.

FOREIGN INTEREST STRONG

Most impressive at the conference was the strong foreign representation, exceeding even that of U. S. airlines. On hand, along with ignition specialists of the U. S. Air Force, Navy, Army, Royal Canadian Air Force, and Civil Aeronautics Administration, were these U. S. and foreign carriers:

U. S.—American, Braniff, Delta-C&S, Eastern, National, Northwest, Pan American, TWA, and United.

Foreign—Aeronaves de Mexico, Air France, Avianca, BOAC, Cruzeiro do Sul, Iberia, KLM, LAV, SAS, South African, and Trans-Canada.

The answer to the remaining problem, one of excessive brush wear, has proved the most elusive, with the same brush materials and surface finishes showing wide variations in wear rates on different units, even under closely controlled laboratory test conditions. Just how erratic this performance can be is also demonstrated by the wide variation in experience of operators in the use of surface finishes involving graphitized, non-graphitized, and vapor-blasted treatments, or merely polishing with a 400 grit paper.

Big obstacle

The big obstacle, as Scintilla sees it, is the lack of a satisfactory method of determining whether the plate finish is or is not good. Such equipment as brush analyzers and profilometers have not successfully supplied the desired answers.

How real the distributor removal problem is to the airlines today was most pointedly expressed by United Air Lines' Norman Davis, who reported some 2500 replacements over a 10-month period with the bulk resulting from carbon brush-plate wear or burning. General airline experience ranges from 2.0 distributor removals per 1000 engine hours to as high as 7.0 for the R-2800, and from 0.2 to 4.7 removals for the R-3350. Equivalent magneto changes on R-4360 engines extended from a low of 1.0 per 1000 hours to a high of 7.6.

Among other service fixes reported by Scintilla, by type of ignition system, were:

Wright R-3350—Adoption of a new manual spark advance control relay, which in service has operated over 500 hours before failure, compared with 25-100 hours for original relay. An additional change being tested by Scintilla will replace the present nylon stop button in the relay with a phenolic type offering better resistance to vibration.

P&W R-2800—Magneto rotating magnets have been balanced and provided with a 360° pilot; primary coil screw-type winding terminals have been adopted to prevent wire breakage; and primary leads have been changed to the control cable type lead with swaged terminals and a Wirelon covering.

P&W R-4360—A .016" longer cam follower has been adopted in the breaker assembly to improve felt contact, distributor plates have been graphitized similar to the R-2800 to improve brush wear, primary leads changed to the Wirelon steel cable, and high-tension leads changed from the conduit type with steel elbows to a Plasticol impregnated 3-layer silver braid sleeving design. • • •

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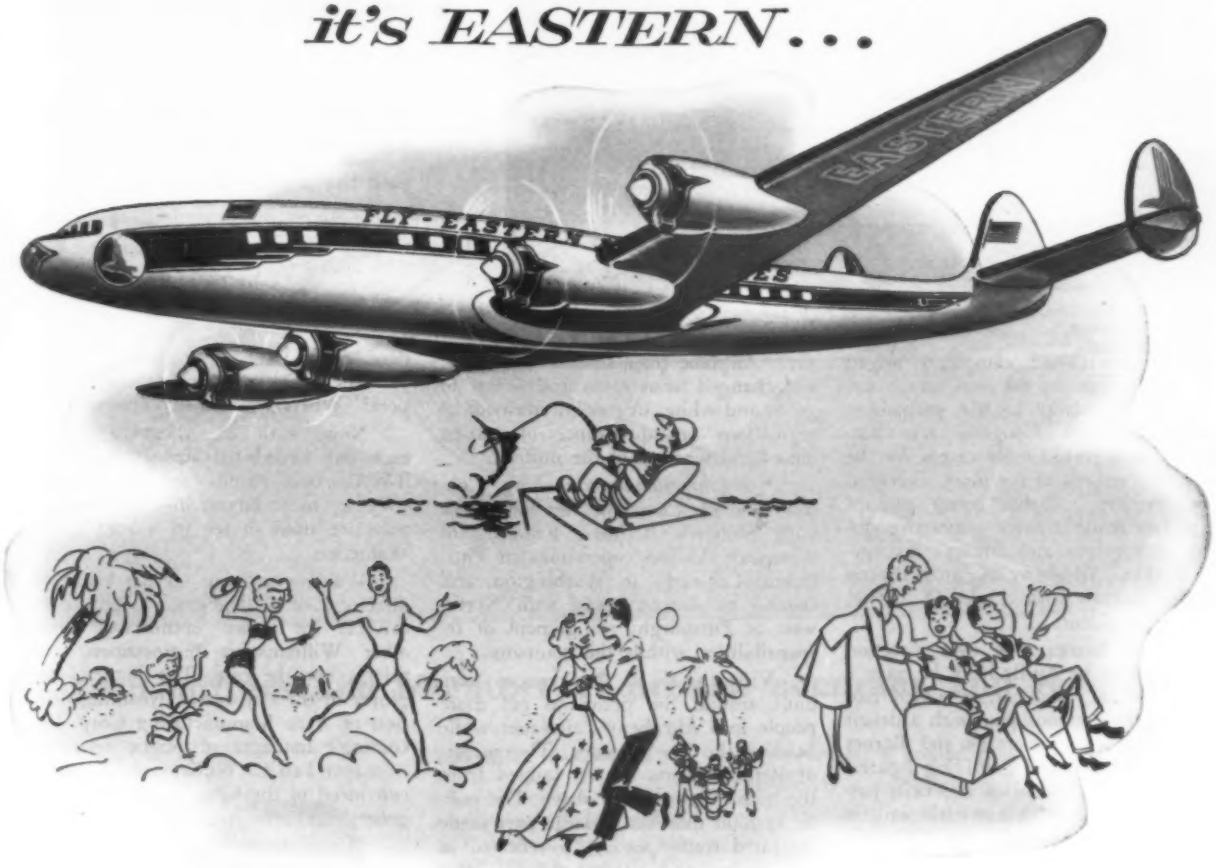

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How Its Passengers Helped Revive A Sagging Local Line

Allegheny's Les Barnes parlays sound business and the personal touch

By WALTER A. KILRAIN

THE determined campaign waged this summer by the local service airlines in an attempt to win permanent certificates from Congress was buttressed to a considerable extent by the operating records of the more successful local carriers. Of this group perhaps none has made a more impressive display of vigorous and efficient management than Allegheny Airlines during the 17 months since Leslie O. Barnes became president.

When Barnes took over direction of Allegheny in April, 1953, he gave a new direction to a carrier which had finished the previous year with a deficit of $141,000. By the year's end Barnes could point to some gratifying figures: a $4000 profit instead of a deficit; passenger-miles up 18%; non-mail revenue up 21%; mail ton-miles up 12%; air express ton-miles up 9%.

The upswing in business did not stop there. In April of 1953, AAA traffic stood at 2.40 million passenger-miles. One year later it had reached 3.23 million. The rise continued into the summer: in June, 4.07 million; in July 4.58 million. Every month this summer has seen new traffic records for Allegheny, with totals running approximately 30% above those of the previous year.

The changes that have contributed toward the brighter picture include:

• *Greater emphasis on traffic and sales:* Station personnel increased by approximately 30%, reservations procedures overhauled, advertising budget more than doubled, scheduled departures increased more than 20%, three more planes added to the fleet, 33% more miles flown.

• *The personal touch:* Visits by Barnes to every community served by AAA, talks with employees, mid-air chats with passengers, personal answers by Barnes to all letters of complaint.

• *Sprucing up of the line's appearance:* Airplane color scheme redesigned and changed from green and yellow to green and white, stricter enforcement of regulations on appearance of station offices and wearing of the uniform.

• *Organizational retrenching:* Consolidation of ticket office in New York with Mohawk Airlines; handling of American Airlines' operations in Pittsburgh, Colonial's in Washington, and sharing of counter space with Northwest at Pittsburgh; realignment of responsibilities within the company.

Virtually all of the changes were built around the desire to get more people into Allegheny's airplanes while holding the line on costs. The success of Barnes' efforts can be judged from the traffic figures cited above. The public opinion that has in large part made increased traffic possible is reflected in a comment made toward the close of a meeting Barnes held with civic leaders of Williamsport, Pa.

"Where the hell's Williamsport?"

The citizens, on Barnes' invitation, were airing their complaints about Allegheny's operations. One wanted to know why there weren't more flights; another had a grievance about reservations procedures. After this had gone on for a while, the purchasing agent for one of the large local manufacturers stood up. "All I've got to say, Mr. Barnes," he said, "is that you pulled us out of a hell of a hole."

The hole that Williamsport was in was the result of being off the main passenger railroad routes and receiving only limited service from the two trunk airlines which served the city, Capital and TWA. Williamsport felt isolated, and since it is the site of a widely diversified group of industries, its isolation was bad for business.

"I'd go into a buyer's office in New York and give him my card," says William R. Waldeisen, the president of a local firm making braid, "and he'd look at it and say 'Williamsport?' Where the hell's Williamsport?"

Now, with 16 Allegheny flights each day added to Capital's four and TWA's two, things are looking up. "We see more buyers in a month now than we used to see in a year," says Waldeisen.

Waldeisen, being on the board of directors of Allegheny, might conceivably be more enthusiastic than other Williamsport businessmen, but this is not the case. The biggest employer in the city is the Lycoming division of Avco Manufacturing Corp. Lycoming's manager of public relations, ex-mayor Leo C. Williamson, is just as convinced of the value of air service in general and Allegheny's in particular.

"I can leave here at 8:15 in the morning," says Williamson, "and be walking into a meeting in the Savoy-Plaza in New York by 10 o'clock. Or leave my office at nine, fly to Pittsburgh to meet someone for lunch, get my business taken care of, and be back

"In the face of a diminishing rail passenger service to our intermediate cities and communities . . . it must be apparent that the only alternative for fast, frequent, and efficient transportation is the scheduled air carrier," says Barnes.

in my office by 3:55. We haven't

per month, and the estimate for this

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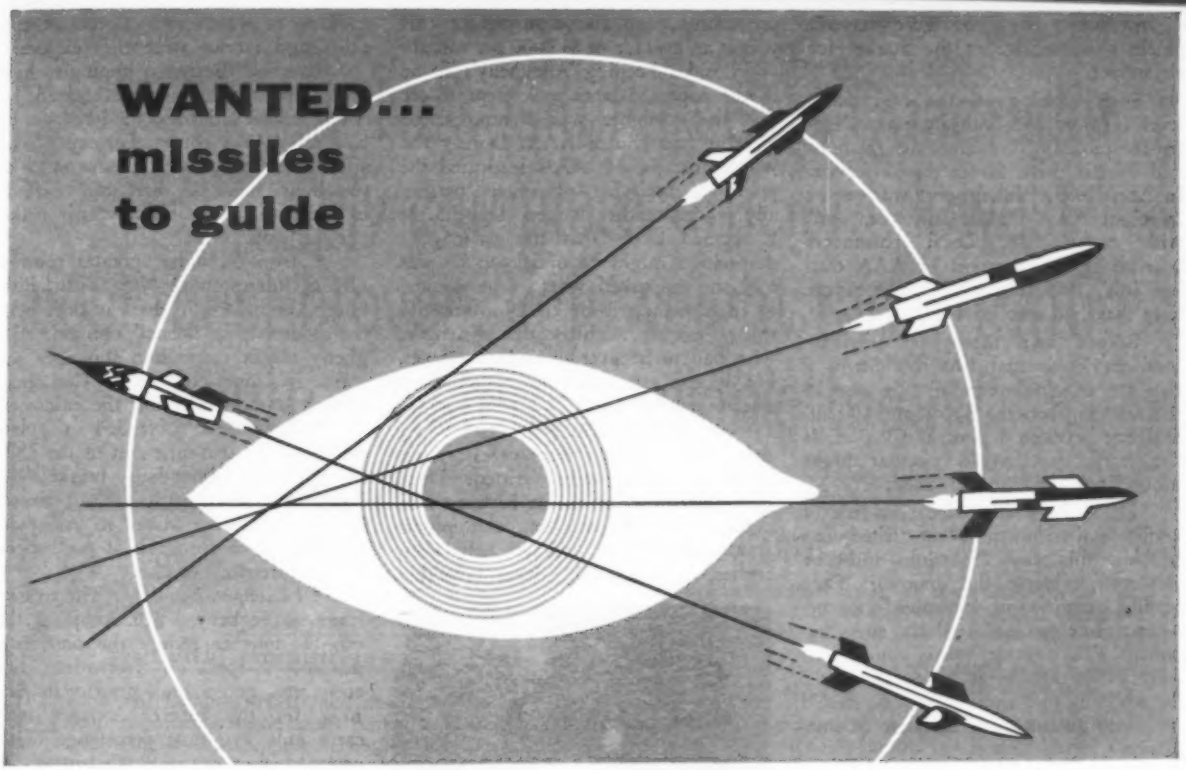

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in my office by 3:55. We haven't touched the surface of the market for air service."

Such backing on the community level is prompted both by Barnes' intensive program of community relations and by his drive for increased service. In April 1953, Williamsport was served by eight AAA flights daily compared with today's 16. Local passengers boarded at Williamsport by AAA during July, 1953, totaled 1173; one year later they had reached 1411.

Barnes' own theory on adequate local service is that two round-trips a day are an absolute minimum, one in the morning between 8 a.m. and 10 a.m. and one between 4 p.m. and 9 p.m. If the traffic justifies it, another flight around mid-day can be added.

David L. Miller, vice president of traffic and sales, puts the scheduling problem this way: "Schedules must be designed to serve the majority. They should permit same-day round-trips between intermediate points and terminals. They must make connections with other airlines at major terminals. In addition, our aircraft must be routed so as to rotate them through Maintenance.

Allegheny's drive toward greater service brought scheduled departures up to 5579 in June of this year, compared with 4608 in June of 1953, an increase of about 21%. Passengers carried rose 29% in the same period.

The increased traffic represented the effect of adding three more DC-3's to the dozen the line operated in early 1953.

Greater productivity

The traffic increase also reflected greater productivity from Allegheny's employees. Despite the fact that station personnel were increased by about 30% and the overall payroll by 20%, traffic increased sufficiently so that the revenue-miles per employee rose from 619 (June 1953) to 673 (June 1954), up 9%. During the same period the number of passengers per employee rose 7%, from 44.6 to 47.9.

The fact that load factors continue relatively high despite use of additional planes has convinced Barnes that "the market is there if you provide a variety of schedules."

Once the schedules had been established, Allegheny had to tell the public about them. It also had to acquaint its customers with the fact that it was no longer All-American Airlines, a name it dropped in February, 1953. Advertising, like other sales functions, was consequently given new emphasis. Total advertising expenses were running approximately $3000 to $5000 per month in 1952. In 1953 they rose to $10,000 per month, and the estimate for this year is an average of $12,000 per month.

Besides keeping Allegheny's name in the papers, Barnes took steps to see that the customer was accommodated once he had chosen AAA. During the winter just passed, AAA instituted the policy of notifying passengers personally when weather looked doubtful. If it seemed likely that the passenger's destination might be overflown he was told so, and asked whether he wanted to attempt the trip by air. Not only did this reduce the resentment of passengers who had to be overflown, says Barnes, but it also cut passenger cancellations due to weather by 60%.

In some 2000 to 3000 cases where delays or overflying were necessary, explanatory letters were written. These were divided about evenly between residents of AAA's territory and people from other areas. About half drew replies, of which 75% were favorable.

"Is it in the public interest to continue air mail and air transport service to intermediate-sized cities in the nation?"

In addition to keeping in touch with his passengers through such devices, Barnes keeps in touch with his employees by spending about two days a week in the field. Every three months he holds a series of meetings for pilots, station personnel, and flight agents at Pittsburgh, Newark, and Washington. A fourth meeting is held with mechanics from the entire system.

These meetings are designed to serve as a two-way medium of communication. They constitute a follow-up to a concerted effort Barnes made during his first year to visit every station, get acquainted with as many employees as possible, and become familiar with the 50 communities served by AAA.

Visits to these cities extended over three or four months and were generally arranged to begin with a lunch at a service club or with some other citizens' group, followed by a tour of the community. In most cases these meetings wound up in question-and-answer sessions, in which the subjects of subsidies and service were the features.

- *Service:* Barnes is hoping to have more non-stop service authorized between smaller cities and the larger terminals on AAA's routes. Passengers will adjust their departure times as much as two hours in either direction, he finds, in order to take a flight which makes one less stop.
- *Area:* Ohio has greater community of interest with New York, Pittsburgh, and Detroit than it does with the midwest, in Barnes' opinion. Allegheny might move into this area and stake its four corners at Cincinnati, Detroit, New York, and the east coast.
- *Equipment:* Needed—a plane with half the seat-mile cost of the DC-3 to "tap a tremendous market." If Barnes has discovered such an aircraft he is not talking about it. Allegheny is watching the progress of the helicopter, but from a distance.
- *Passenger handling:* The average fare on Allegheny is $10. Anything that can be done to reduce the portion of this that is spent on reservations, ticketing, etc., gets a high priority in planning for the future. Airlines today carry only a minute percentage of the commercial carrier traffic that moves distances of 100-250 miles. "If significant inroads were made on this market," says Barnes, "the traffic couldn't be handled with present reservations procedures."

Whether AAA will get everything it wants remains to be seen, but there is no doubt that it already has the hearty support of a lot of its customers. In air-minded Williamsport, which recently celebrated the 25th anniversary of its modern airport, Quinton Beauge, executive editor of the *Sun-Gazette* publications, gives a testimonial that seems to cover the subject: "Allegheny," says Beauge, "has got something." • • •

"The record of the past, of the need, and the service rendered the communities served by the local service airlines does not substantiate any thought or proposal that this service be abandoned or reduced."—Leslie O. Barnes.

FACT

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- ☐ *All* controls, both electronic and mechanical, are *remoted* to operator console. At the turn of a switch, the operator selects any of four radar displays within five seconds!
- ☐ Instant multiple runway coverage at the turn of a switch. Both antennas rotate electrically through 360°. No need to go out to the field to realign the entire equipment. Surveillance antenna tilt through 10° is also controlled remotely.
- ☐ Operates on 50 or 60 cycle power. Sets up, ready to operate within 2 hours.
- ☐ 20 mile range on final approach. Operator can switch, in seconds, to 10 mile display as aircraft comes in.
- ☐ Linear or logarithmic range marks and either fast or slow scan. Operator can switch, instantly, to logarithmic sweep and fast scan for greater precision during final critical approach miles.
- ☐ Surveillance display and airport taxi display can be off-centered instantly, giving maximum range in any desired direction.
- ☐ Provides widest angle of coverage with 30° in azimuth and 30° in elevation. Operator can also select either 30° or 7° elevation coverage.
- ☐ Circular polarization, eliminating rain or snow clutter, is already included in basic equipment.
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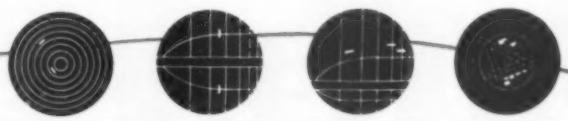

Gilfillan

LOS ANGELES

People

NWA Makes Nyrop Appointment Official

Northwest Airlines has named Donald W. Nyrop, former CAB chairman, as its new president, filling a vacancy which has existed since the resignation last March of Harold R. Harris (AMERICAN AVIATION, *Aug. 30*).

Nyrop will assume his new duties in mid-October and will also serve as a member of NWA's board of directors.

Malcalm S. Mackay, executive vice president, who has been in charge of administrative affairs since Harris' resignation, will continue in an active role with the company, according to Nyrop.

Other important personnel changes around the industry included:

Manufacturing

Brig. Gen. Pierpont M. Hamilton, USAF (Ret.), has joined Hiller Helicopters' board of directors.

Cleeman Withers elected v. p.-manufacturing, engineering, and sales for Jacobs Aircraft Engine Co.

Charles Brunell appointed v. p.-sales of Cook Electric Co. from mgr. of the Diaphlex Division. **Daniel Shevelinko** is the new Diaphlex div. head.

Sharp

Johnson

Russell C. Galbraith has moved up from chief accountant to director of financial operations at Lockheed's Georgia Division. Other Georgia Div. changes make **Robert F. Stoessel** mgr. of the sales engineering dept.; **Sheppard Homans** mgr. of the conservation dept.; **Frank J. Graham** mgr. of government-furnished property dept.; and **J. Thomas Brooks** mgr. of stores dept.

John E. Finn named mgr. of industrial relations for Bell Aircraft's Texas Division from mgr. of personnel operations for Bell's Niagara Frontier Div., replacing **William H. Gunderson,** resigned.

Justin R. Sypher named mgr. of Du Mont's government contracts div. office in Washington, replacing **Zeus Soucek,** now with General Mills' Mechanical Div.

Air Vice Marshal Alfred C. H. Sharp, RAF (Ret.), is now with Martin Aircraft to aid in the study and development of foreign markets.

Edwin C. Laski appointed sales mgr. of Aero-General's new southwest regional office in Dallas.

Clifford W. Snider promoted from assistant to comptroller of Solar Aircraft Co.

Dr. James F. Reagan, formerly with Radioplane Co., named to head Beech Aircraft's new division being set up for designing guided missiles and target aircraft.

Myron A. Tracy appointed mgr. of The Garrett Corp.'s Washington office, succeeding Roy S. Leckey, now supervisor of contract admin. for AiResearch of Arizona, a Garrett division.

E. Fred Buehring named plant mgr. of Temco's aircraft overhaul and modification center at Greenville, Tex., relieving **Herrol W. Bellomy,** on leave because of ill health.

C. T. Reid appointed director of engineering of Northrop Aeronautical Institute.

August R. Tiburzi, formerly gen. mgr. of Air Associates' Hackensack branch, appointed gen. mgr. of the new international division.

Airlines

Robert E. Johnson, v. p. and ass't to the president, and **Paul A. Bissinger** of San Francisco, elected to United Air Lines' board of directors.

Sheikh Najib Alamuddin, former gen. mgr. of Middle East Airlines, appointed advisor on Middle East affairs for British Overseas Airways Corp.

Albert Green, treasurer of the Murry and Leonie Guggenheim Foundation, elected to the board of directors of Colonial Airlines.

Lawrence W. Jewell, formerly CAA Airways Operations Supervisor of Terminal Areas, appointed ass't mgr. of the Southern Region Operations Office of the Air Transport Association.

George S. Dart, formerly with The Flying Tiger Line, elected v. p. and eastern sales mgr. of Pacific Air Freight.

Jack K. Svitzer named director of traffic from director of advertising and research at Allegheny Airlines.

Government

Rear Adm. Albert K. Morehouse, reassigned from Commander Carrier Div. Four to command the naval elements assigned to the Continental Air Defense Command.

Col. Joshua T. Winstead, Jr., assigned to headquarters, Air Research and Development Command, as executive officer.

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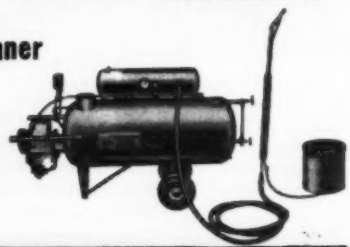

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America's first jet transport is in the air

This is America's first jet transport, pictured on the historic occasion of its first flight. When it lifted off the runway at Boeing's Renton, Washington, plant, it marked a milestone in the field of aerial transportation in this country.

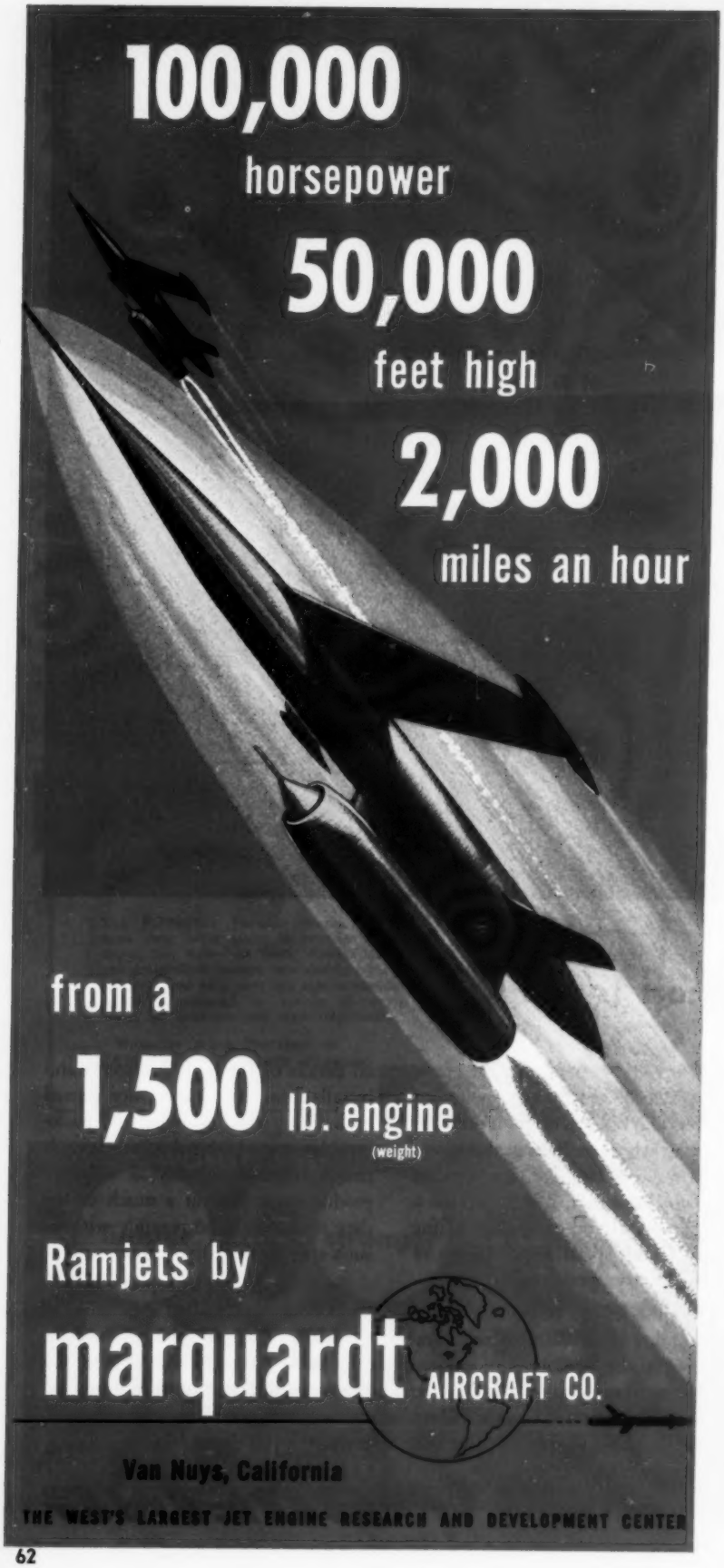
The airplane you see is a prototype model, built to carry forward flight test work and to demonstrate the advantages of its advanced design. Faster than any previous transport by more than 100 m.p.h., it can span the continent in five hours, the Atlantic in seven.

In a tanker version, the new Boeing will be able to accompany jet bombers and fighters on their missions and refuel them in flight at their most efficient speeds and altitudes. And as a military transport, it will provide a vital personnel and cargo supply line geared to the speed requirements of all-jet military operations.

The new jet—to be known as the Stratotanker in its military configuration, and as the Stratoliner in its commercial version—is now undergoing intensive flight tests at Seattle. These tests will enable Boeing to prove out all details of the design, systems and installations. The experience gained in building and test-flying the prototype has an additional advantage. It makes possible delivery of a better production model, at a much earlier date than would be possible without such specific prototype experience.

America's first jet transport is backed by Boeing's unequalled experience in the field of large, multi-jet aircraft. It is backed, too, by Boeing's 38-year history of designing and building advanced aircraft of remarkable performance and dependability.

BOEING



★ **Paul A. Azinger,** Hamilton Standard. Staff ass't to factory mgr., Windsor Locks, Conn. (30 years.)

★ **Barney H. Tumey,** TWA. O'Seas accounting & foreign exchange director, New York.

★ **J. I. Greenwald,** TWA. O'Seas station and inflight service supt., Paris.

★ **Theodore M. Moffit,** TWA. Captain, Los Angeles.

★ **Richard J. Stevens,** TWA. Foreman in charge—line maintenance, Kansas City.

★ **Joseph S. Pitisci,** EAL. Engine overhaul supt., Miami.

★ **George A. Carr, Sr.,** PAA. Line station foreman, San Juan.

★ **Jose M. Cavazos,** PAA. Cleaner, Brownsville, Tex.

★ **Charles W. Chapman,** PAA. Shift foreman, Miami.

★ **Dorothy F. Davies,** PAA. Cost analysis supervisor, Miami.

★ **Ernest E. Holiman,** PAA. Foreman specialist in aircraft service, Miami.

★ **Roy G. Mackenzie,** PAA. Communications specialist, Miami.

★ **Luke W. Seignious,** PAA. Senior inspector, Miami.

★ **Harold E. Thomas,** PAA. Master mechanic, Miami.

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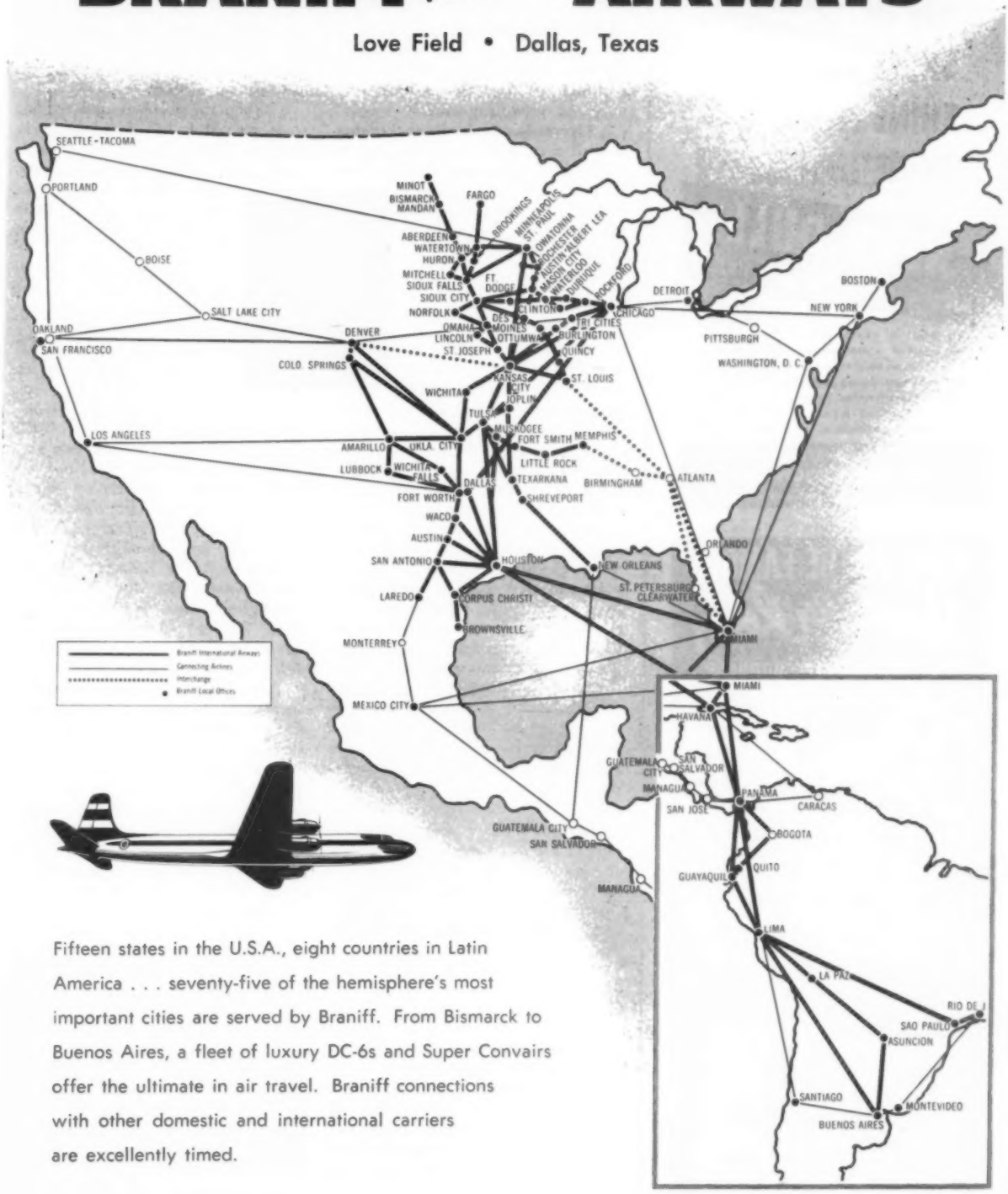

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Extra Section . . .

By Walter A. Kilrain

Progress in flight safety is uncertain and accidental since it is guided by accident

ARE ACCIDENTS too accidental to be useful? The question is the crux of a theory of flight safety that may send researchers off on a new and promising tack.

Operations research, the evaluation of a complete operation instead of the bits and pieces that comprise it, is already familiar as a means of weighing the effectiveness of military tactics and routines. In manufacturing, the approach is being applied as a means of evaluating new designs. The time has come when we must apply the same sort of wide-angle thinking to air safety if we hope to continue lowering the fatality rate in air travel.

The above conclusion is one of the results of a look at air safety taken by Maurice H. Slud, mathematician on the staff of the Cornell Aeronautical Laboratory in Buffalo. One historical fact is the key to much of Slud's thinking: 20 or 30 years ago most accidents were caused by the failure of components, such as engines or control systems. As the accidents were investigated the components were improved until today they cause relatively few accidents.

Today the system as a whole is the root of the trouble. This change in accident causes, as well as other considerations, suggests to Slud that flight safety is badly in need of a new investigative technique.

A four-engine airliner, for example, lost an engine while preparing to make an ILS approach. It continued the approach and when it broke out of the overcast found itself out of alignment with the runway. As it tried to correct for this, one engine at first failed to respond, then, when full throttle was applied, produced a surge of power. The plane overshot.

This accident typifies the sort of thing that Slud believes is not being adequately handled by conventional methods of accident investigation. The engine failure was not the cause, the misalignment with the runway was not the cause, and the other engine's balky performance was not the cause, but all three in combination were too much for the unfortunate airliner.

When the accident investigation team arrived it was faced with the problem, not of rooting out a single cause, but of saying something meaningful about a series of events that might never combine in just the same way again.

The best way to say something helpful about such endlessly varying combinations, Slud believes, is by statistics. In each situation under study—for example, an ILS landing—the important factors could be determined and expressed in terms of probabilities. If such analytical statements were fed into an electronic computer it could calculate a number of possible trajectories in a short time. From these, the safety engineer could take a point of break-through at a given distance off the runway centerline and estimate the risk involved in attempting a landing from that point. Such "tables of risk" would then constitute a means of measuring the safety of an operation.

At present the lack of such a measuring rod is a major problem. One current slogan asserts that "Safety Is No Accident." Slud's theory suggests rather that "safety" is whatever element of risk the public and the airlines are willing to accept, since risk-free flying, like risk-free living, is unattainable. The job of the safety engineer working along these lines is to develop some means of *quantitatively* determining the risk in various operations, then telling management about it.

Of the present concept of safety, Slud observes: "A structure, mechanism, or routine is called safe if it has not been cited as a cause of accident. . . . Safety judgments are consequently unstable, and may be changed by tomorrow's newspaper. . . . It is not surprising, therefore, that progress in safety is uncertain and accidental, since it is guided by accident."

FOR EXECUTIVE AIRCRAFT, EVERYTHING . . .

. . . including the kitchen sink

To supplement its conversion service, Mallard offers a wide range of accessories

CONVERSION and modification of existing aircraft for business flying use is probably one of the most highly competitive enterprises in the industry. To attract the business their way, conversion centers are constantly improving on designs of interiors, innovations for improvements of plane and component performance, and modernization methods.

The firms have gone beyond just providing airframe and engine overhaul and interior conversions. To give "just that little bit more," several have gone into the business of designing and producing accessories offered not only to conversion customers, but available in kit form. These accessories range from the things needed in executive transports for performance and comfort, up to and including the "kitchen sink."

Mallard Industries, Inc. of Bridgeport, Conn., one of the leaders in the field of executive aircraft service, has made a specialty of supplementing its conversion and modification service with Mallard-designed and produced accessories and components. In an effort to constantly improve aging aircraft types, Mallard offers a wide list of flight and comfort aids for both single- and multi-engine aircraft. Some of these are:

• Vent kit for the Navion which improves cockpit ventilation through the installation of a door-like outlet near the pilot's knee. Also, a rear step for the Navion provides easier access into and out of the plane.

• A self-contained step unit made of steel tubing and plate for the Beech D-18S which is permanently attached to the plane door, eliminating the need for the pullman step usually carried around. The unit is attached to the inner door frame at the sill and is pivoted down manually when needed. In flight, it remains flush against the door.

• A mounting base for the Grimes Rotating Beacon, designed principally for the DC-3, which is similar to a shoe, fitting over the fin for safe beacon installation.

• Furniture fittings by Mallard which include a desk cerated to consume the least amount of space, but still provide maximum work and storage space.

• A basic galley unit built for and adaptable to particular needs and uses. The basic unit is made of aluminum for lightness and is then covered with stainless steel. It provides a heat-insulated drawer and a cold-insulated drawer, as well as storage area. In one case, Mallard expanded this unit to include a sink and rotisserie unit.

Popular plastic nose Lodestar installation features Mallard-designed mounting for ADF loops.

Began conversions in 1950

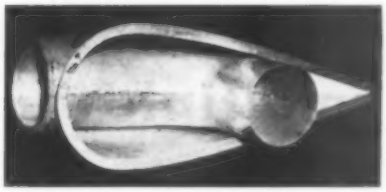
Other components are designed as needed. One popular modification favored by Lodestar owners is removal of the metal nose equipped with the hanging ADF loops which cause over-drag. It is replaced with a plastic nose in which the loops are housed. Mallard designed the special loop support for the ADF installation and also the attachment ring for installing the plastic form.

Mallard's Bridgeport conversion center went into operation in 1950. Under the direction of R. B. Futtner, vice president and general manager, work is carried out at the municipal airport in four large hangars. One of the hangars houses the various shops where conversions and modifications are carried out. Another is for paint jobs, engine changes, and turn-around maintenance.

Furniture, featuring a specially constructed desk with maximum of storage space.

The other two hangars are for permanent tenants, and are where Mallard bases 15 multi-engine executive planes, including D-18's, Lodestars, and DC-3's, as well as a variety of single-engine equipment.

Kitchen sink and rotisserie in an elaborate custom-built galley for an executive DC-3 owner.



Ram air scoop for Janitrol heater in DC-3, which provides air supply for combustion heater.

Mallard maintains a staff of from 50 to 75 in Bridgeport (depending on workload) of which 75% are technical personnel. The balance is composed of line service, and non-skilled workers.

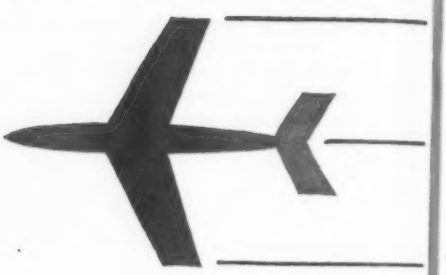
Although its work is almost all devoted to the executive user, Mallard has a contract with CAA to do inspections (up to 360-hour) for CAA's La-Guardia Airport-based DC-3's and D-18's. It also was responsible for converting several Douglas A-26's for tow-target work and for installation of bomb racks for the French Air Force.

Mallard also maintains an operation at Teterboro, N. J., mainly for service and maintenance. But in its conversion hangar here, Mallard has been carrying on its work for New York Airways. Contract calls for new interiors on NYA's five S-55's. • • •

Basic stainless-steel-covered galley for the DC-3 with insulated drawers for hot food and ice storage.

Saginaw offers

and multiple circuits in ball bearing screws offer multiple advantages



- **less weight** In a Saginaw Ball Bearing Screw every ball carries its share of the load. No balls "go along for the ride", simply as spacers. Thus, far fewer balls are required and therefore a substantially shorter, smaller and lighter nut is necessary to contain the balls for a given load.
- **greater capacity** Conversely, a nut of a given length is capable of carrying a substantially greater load than those of other designs. Thus, either way, a Saginaw Screw is advantageous.
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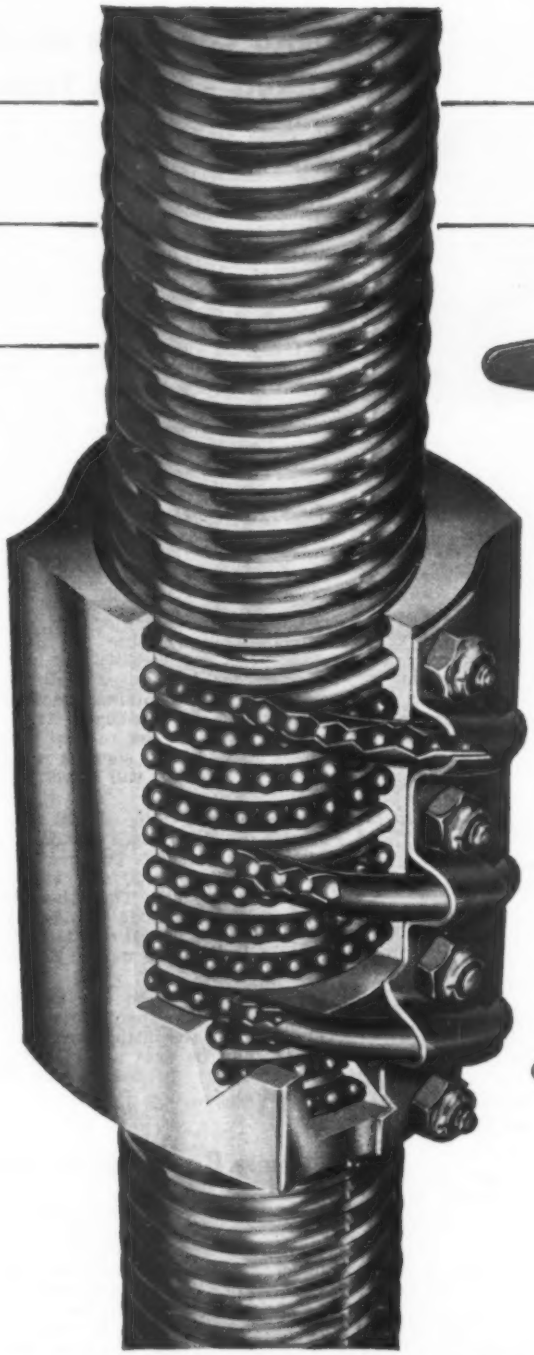

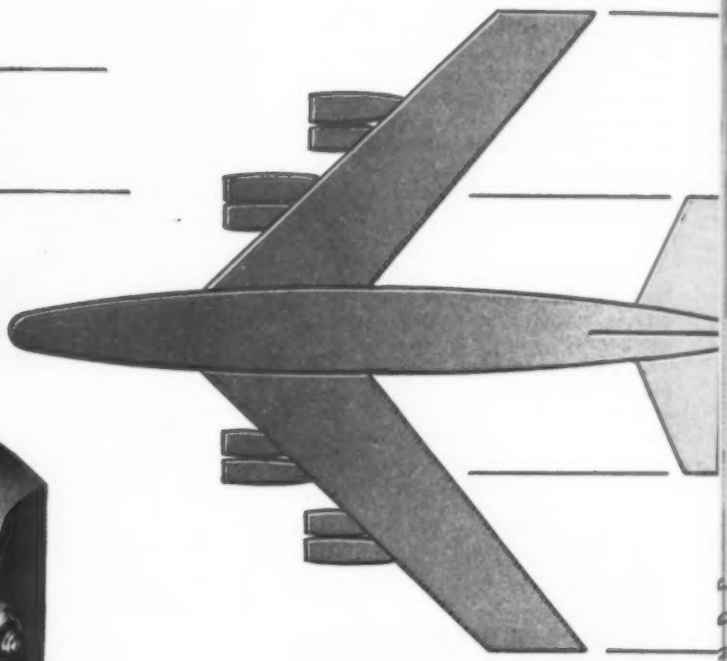

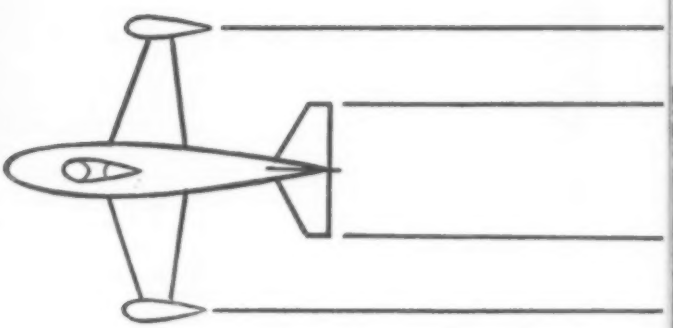

GEAR DIVISION

GENERAL MOTORS CORPORATION • SAGINAW, MICHIGAN
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AIRLINE COMMENTARY

• TRAFFIC • SALES • PUBLIC RELATIONS • *by Eric Bramley*

SALES officials repeatedly emphasize that airlines should place less effort on trying to steal passengers from each other and concentrate more on developing new business. Yet we note that one carrier awarded a bond to an employee in its "sale of the month" contest for persuading a passenger to cancel his DC-7 reservation on another line and ride one of his company's DC-6's.

•

For several years Northwest Airlines has been calling on Capt. Harry McKee whenever it needed a speaker for a civic group, women's club, etc. This starts to take up quite a bit of a pilot's spare time, so McKee looked around for help—and ended up doing things in a big way. He's now in the process of organizing a group of 20 pilots that will not only accept speaking engagements—it intends to go out and hunt for them. Speeches (pilots will wear their uniforms) will cover all phases of aviation and won't deal specifically with NWA. Later it's planned to add 20 stewardesses. This sounds like one of the best ideas to sell aviation that's come along in many a moon.

•

This is a true story, with the names changed. An airline public relations man (we'll call him Sam) was offered a job with another carrier and decided to take it. Soon after his decision became known, he was aboard an airplane with a vice president and another employee (Joe) of the airline he was leaving. Joe started a lecture about why didn't Sam stay with a company where he could get ahead, about how the other airline wasn't worth working for, about how all that he'll be doing in his new job is carrying the vice president's bag, etc. The vice president who was aboard was a little more broad-minded about people trying to get ahead in the world. As the plane was landing, he stopped the conversation very effectively with the remark: "Dammit, Joe, shut up—and carry my bag."

•

Airlines are wondering what's happened to the Travelfares plan, which proposed to attach coupons to certain grocery store merchandise, making a collection of them exchangeable for air travel. Carriers agreed some time ago to participate. But letters to Travelfares' Seattle office bring no response.

New public address system at Denver Municipal Airport demonstrated here by Continental Air Lines' agent Ted Reeves uses a standard Seeburg 100 record player with push button selectors at ramp gate positions. Flight announcements are prerecorded by professional radio talent on a 45-rpm disc with chimes on the recording used to attract passengers' attention. Installation was supervised by Airport Manager Herman C. Gassert and cost $2550 including all equipment and labor.

Delta Can't Lick Block Tickets - - Uses Them

Delta Air Lines, deciding to use the block ticket plan, has notified CAB that it is withdrawing concurrence in Capital Airlines' motion to reinstate investigation of the plan. DAL said that it still holds the opinion that the block ticket plan is basically unsound and improper, but "inasmuch as Delta's competitor's are and for some time have been placing blocks of tickets in the hands of major travel accounts . . ., DAL can no longer stand idly by while traffic is diverted." Accordingly, the carrier will proceed to place blocks of tickets in the hands of such travel accounts as necessary to maintain its competitive position.

Cardboard Kennels Save

Western Air Lines, going back into the dog and cat transportation business, has adopted a heavy cardboard disposable container for confining the animals while en route. WAL will provide either of two sizes of the "Kwik Kennel" for $5, and after the trip is completed the container becomes the property of the passenger. These containers may not be re-used over the routes of WAL, thus assuring pet owners that their animals will travel in sterile containers.

In addition, shippers will save some money on the freight charges, which are based on weight. The smaller of the cardboard kennels, 20 x 16 x 27 inches, weighs 8½ pounds. The other, 38 x 19 x 30 inches, weighs 14 pounds. By comparison, the all-metal counterparts used by some airlines weigh 23 and 50 pounds, respectively.

From Chicago to San Francisco, a 25-pound cocker spaniel weighs about 30% less in the little cardboard container than he does in the comparable all-metal one. In dollars and cents—$7.98.

When Baggage Is Cargo

One of the first casualties of CAB's new economic regulations is unaccompanied baggage. Board feels that unaccompanied baggage just does not exist. Either it is accompanied and subject to baggage rates or else it is cargo. As cargo, it may not be called "unaccompanied baggage" because that term is not specific enough, according to the regulations. Consequently, recent proposals for "unaccompanied baggage" have been rejected although many carriers do have such rates which were filed before the new regulations went into effect.

Flush Fitting, Toggle Action

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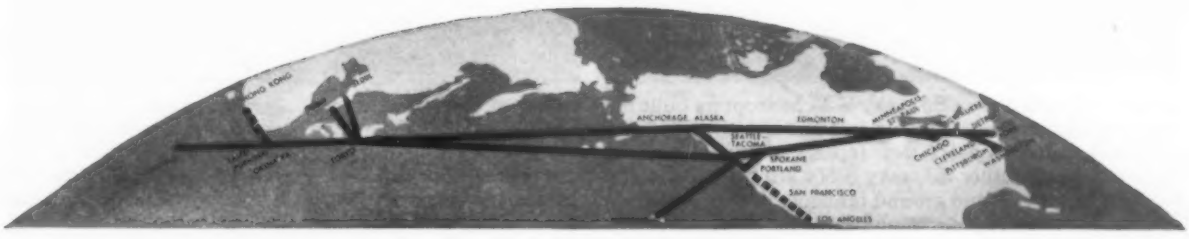

LONDON—Sabena Belgian Airlines recently linked England with Europe by an experimental helicopter flight, first ever made from the center of Brussels to the center of London. One of the airlines' Sikorsky S-55 passenger helicopters flew the cross-channel route in 2 hours 45 minutes, landing at London's South Bank heliport.

ANTARCTIC—Flying over ice-choked seas, S-55 helicopters from the Argentine Navy recently rescued 20 men virtually marooned for the past two years on Graham Land peninsula. The Sikorskys, operated from the deck of an Argentine transport vessel, made six round trips to bring the stranded men to safety.

AROUND THE WORLD WITH SIKORSKY HELICOPTERS

JAPAN—One of eleven Sikorsky S-55 helicopters built for Japan is pictured above being test flown with new flotation gear. This model is for Japan's official Maritime Safety Agency. Other Sikorsky S-55s are being delivered for service with air and ground branches of that country's National Safety Agency and Maritime Safety Agency.

INDIA—Civil purposes such as crop dusting or spraying, illustrated above, will be one major mission of three Sikorsky S-55 helicopters being delivered to the Indian Air Force. Because of their rugged dependability and large cargo capacity, versatile Sikorskys are in wide use for military and commercial purposes around the world.

TEXAS—Once more relief and rescue from flood hazards came with the whirling rotors of Sikorsky helicopters, this time during early summer floods along the Rio Grande River in southwest Texas. In one big airlift alone, thirteen H-19s from Gary Air Force Base at San Marcos, carried 266 passengers from a railroad train stranded by the flood at Langtry. They flew precious drinking water and vital supplies to isolated areas, lifted victims from the torrent and marooned people to safety.

SIKORSKY AIRCRAFT

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Tigers-Slick Merger in Balance

Companies ask for oral arguments on labor issue by September 15

THE future of The Flying Tiger Line and Slick Airways, either as a merged company or as individual companies, appeared to hang in the balance of a CAB decision on the companies' request for modification of labor protective provisions attached last January when CAB tentatively approved their merger agreement.

The airlines claim that adherence to present provisions would expose them to from $2 million to $6 million in employee claims. This, they told CAB, would be impossible and would force abandonment of the merger and possibly more drastic action.

In addition, the companies told CAB that there is not time for the usual procedural steps and requested oral argument no later than September 15, and an immediate show-cause order changing the labor provisions that must be met.

In this respect, heavy opposition appeared to be forming at presstime as the CAB staff and various labor groups protested any action by the Board short of full procedural steps.

Tigers and Slick explained their situation this way: They now employ 1900 personnel, but another 900 have been laid off since the merger agreement was reached in March, 1953. They attributed such layoffs to a fall-off in business. It now appears, they said, that under the labor provisions as imposed by CAB, claims filable by the 900 whose services cannot be utilized at present, and by others displaced or demoted, could financially cripple the companies, jeopardize the employment of the 1900 at work.

Pilots of Flying Tigers backed the companies' position generally. But CAB Bureau Counsel Albert H. Ruppar, the Slick pilots, the International Association of Machinists, and the Air Freight Labor Association, opposed.

Although Slick broke even in 1953 and FTL made an average monthly profit of $150,000, the companies say they had a combined loss for the first six months of 1954 of $1,817,131.

As this issue went to press, the matter was before CAB to decide whether the September 15 argument requested by the companies would be granted or whether full-scale hearings would be necessary.

Trunks to Submit New Mail Rate Proposal

The domestic trunkline industry was expected this month to submit a new service mail rate structure as a settlement to get the industry back on a permanent rate basis. On open rates since April 1, 1954, and with a one to two-year proceeding ahead, the carriers planned to get CAB and Post Office agreement on multiple-factor structure which would include:

- A line-haul rate of 36.25¢ per ton-mile to be applied to total mail carried, and
- A terminal charge of 5.7265¢ per pound to be applied to mail enplaned at each station.

The carriers estimated this would produce an average of 49.82¢ for the industry. Although higher than the 45¢ per ton-mile rate now in effect for so-called "Group I" carriers, the new average rate is lower than service rates of the remainder of the industry and reflects the minimum rate upon which complete agreement might be reached short of a full hearing.

The new rates would apply equally to all trunklines but would produce more or less average pay to a carrier depending upon the number of stations served. Specifically, it is aimed at satisfying the Post Office argument raised last year against variations in rates for two or more carriers operating between the same pairs of points.

At presstime, the rate agreement was being weighed by individual carriers who had been asked by an industry committee to concur prior to filing with CAB. It will be filed on behalf of those concurring although unanimous industry backing was looked for.

Big catch of course is whether the PO will go for a structure which apparently will mean more service mail pay. CAB is known to have prepared a multi-element structure of its own and may advance it if the industry proposal bogs down.

As of now . . .

Hearings in the Air Freight Renewal Case, involving renewal of all-cargo certificates of Slick and Flying Tigers, have been postponed by CAB because of labor difficulties which threaten the merger of the two lines. Originally scheduled for September 8, they have been rescheduled for November 1. Other phases of the case dealing with U. S. Airlines, Riddle, etc., will go on as originally planned with hearings October 12.

An early end to the open mail rate status of the domestic trunkline industry is possible if agreement can be reached on multi-elements service rate proposals of CAB and the industry.

Decisions in the New York-Balboa and Trans-Pacific Renewal Cases are expected to go to the White House for final action this month, while a White House verdict on the Trans-Atlantic Cargo Case was imminent at presstime.

Parties to CAB's New York-Mexico City Nonstop Case hope for a final decision by December 31, although hearings are not scheduled to begin until November 8.

Recent CAB Decisions

Eastern Air Lines turned down by 3-2 vote on petition for reversal of order denying proposed Eastern-Braniff-TWA southern transcontinental interchange service.

Consolidated Flower Shipments, Inc. —Bay Area denied special interim exemption for forwarder-type operations pending decision in Domestic Freight Forwarder case.

Eastern Air Lines and Colonial Airlines turned down on petitions and motions seeking dismissal of "control" investigation growing out of Eastern-Colonial Merger Case.

CAB Calendar

Sept. 13—Prehearing conference, Helicopter Air Service Renewal Case. Washington, D. C. Docket 6600.

Sept. 14—Oral argument, APO & FPO Mail Tariff Investigation. Washington, D. C. Docket 6489.

Sept. 17—Prehearing conference, Atlantic Seaboard Route Case. Washington, D. C. Docket 3051 et al.

Sept. 17—Hearing, SAS Polar Route Case. Washington, D. C. Docket 6800.

Sept. 21—Oral argument, TWA-Braniff Interchange Service Case. Washington, D. C. Docket 1102 et al.

Sept. 22—Hearing, Trans-Texas Airways Renewal Case. Washington, D. C. Docket 6485 et al.

Sept. 23—Hearing, Swissair Foreign Permit Amendment Case. Washington, D. C. Docket 6805.

Sept. 28—Oral argument, States-Alaska Case. Washington, D. C. Docket 5756 et al.

CAB Miscellany

California Central Airlines applied for an exemption to extend California intrastate services to Tijuana, Mexico.

Davenport, Iowa, has applied for east-west service by United Air Lines and north-south service by Braniff Airways.

Delta-C&S Airlines withdrew complaint against "block ticket plan" employed by several carriers; will use plan itself.

Pan American World Airways wants CAB to consider in New York-Florida Case its 5-year-old application to make New York, Boston, Washington, Philadelphia, and Baltimore co-terminals with Miami on Latin American routes.

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FJ-2 Fury — Now operational with the Marine Corps, this Fury set new records by completing rigid carrier evaluation tests in record time. With a speed of over 650 MPH and carrying four 20 mm cannons, the FJ-2 has a range of about 1000 miles and a service ceiling of over 45,000 feet.

T-28B — Faster than many WW II fighters, this new trainer has a top speed of 343 MPH and a service ceiling of 35,500 feet. Now being supplied to both Air Force and Navy training programs, the T-28 was designed for utmost efficiency in training our new pilots . . . incorporating many innovations.

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Maintenance Bulletin Board

Portable Swaging Tool Adapted from Riveter

Northrop Aircraft's tooling specialists have found a way to get around the need for relatively large and expensive machines for swaging terminals to steel aircraft cables. The solution is a portable swaging unit adapted from a commercial riveting tool that weighs less than 25 pounds and will handle all normal aircraft cable terminal sizes.

Designed specifically for fastening

the steel ball terminals to the ends of steel control cables, the new swager completes the operation at a rate of about five seconds per part. The ball and cable are merged by a series of repeated blows until they are literally hammered into a solid piece capable of withstanding the required tension.

Credit for the development goes to Nelson Harvey of Northrop's tool liasion division. Exclusive license for its manufacture has been granted to Aircraft Tools, Inc. of Los Angeles, Calif.

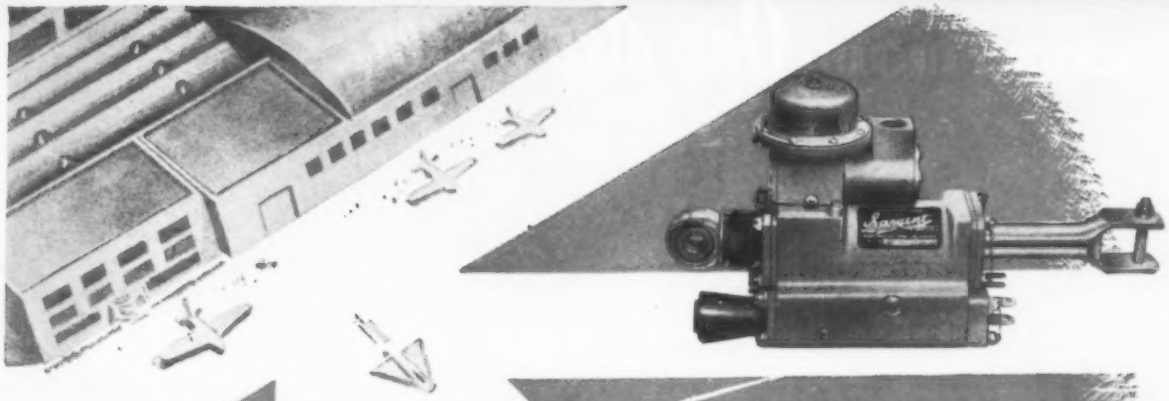
For more information circle No. 1 on Reader Service Card, page 93.

Here's A New Caulking Gun Idea

In contrast with Bell Aircraft Corp.'s adoption of the common household toothpaste tube to solve the problem of how best to apply aircraft sealants (AMERICAN AVIATION, Aug. 30), Douglas Aircraft Co. has found the answer in a new caulking gun of its own design.

According to Douglas, the new gun weighs less than 17 ounces empty, yet will hold 30% more sealing compound than conventional caulking equipment of better than twice that weight.

One of the main problems with sealing dispensers—excessive cleaning time and costs—is licked in the new design by "throw-away" components. Disposable cartridges, plungers, and even nozzles are molded from low-cost



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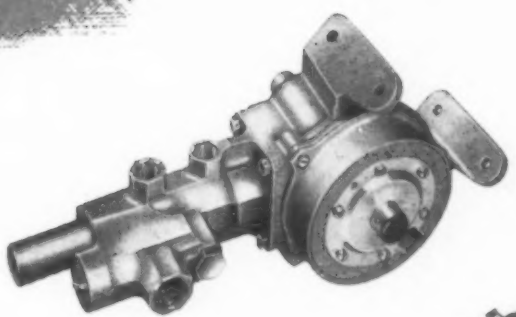

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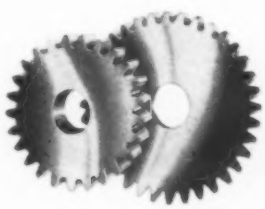

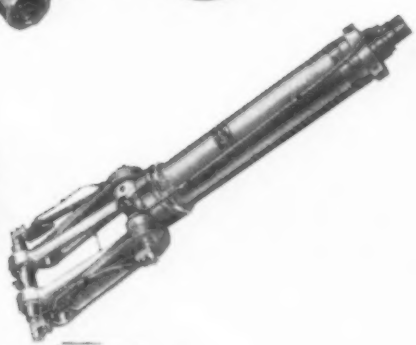

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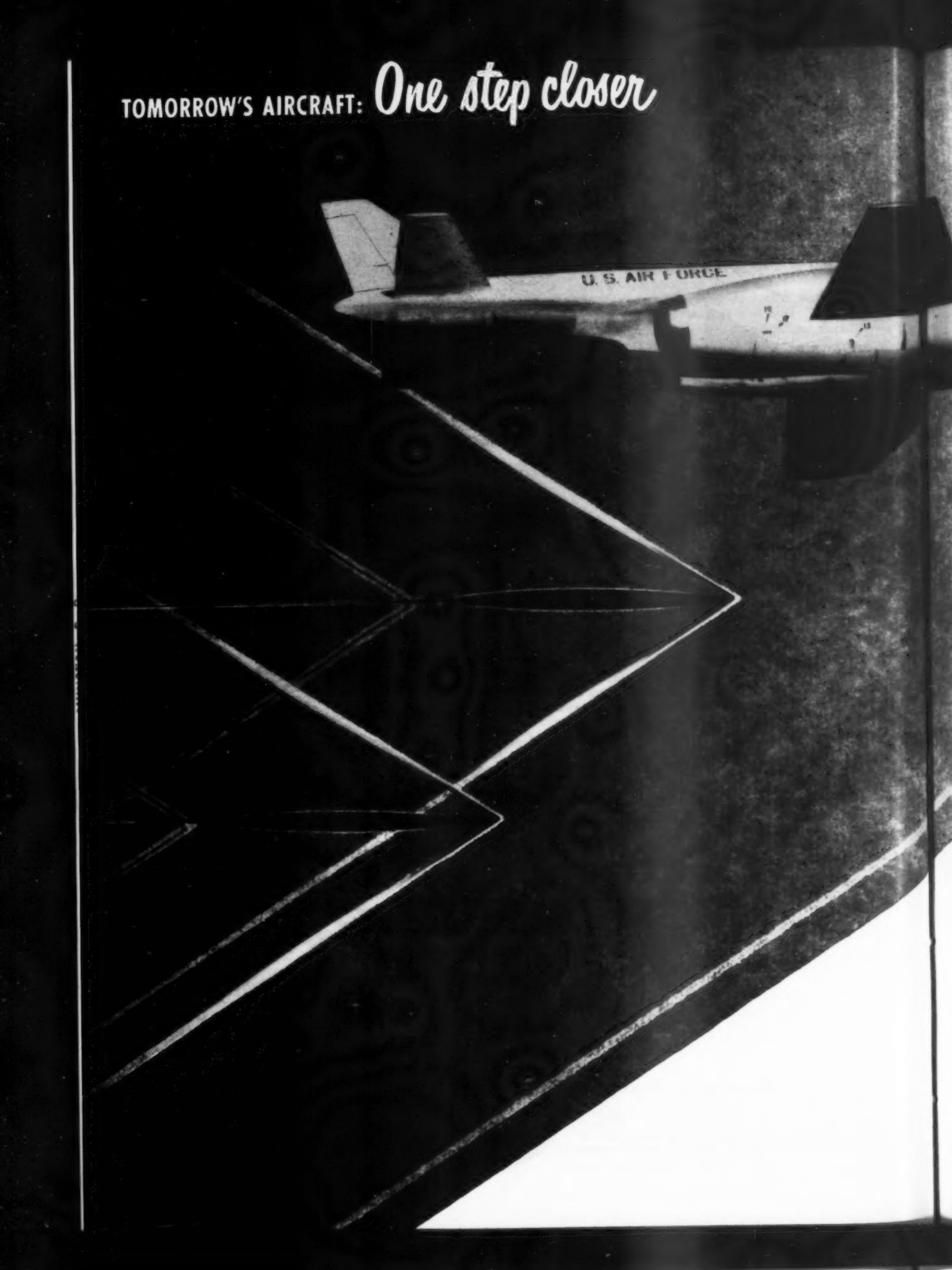
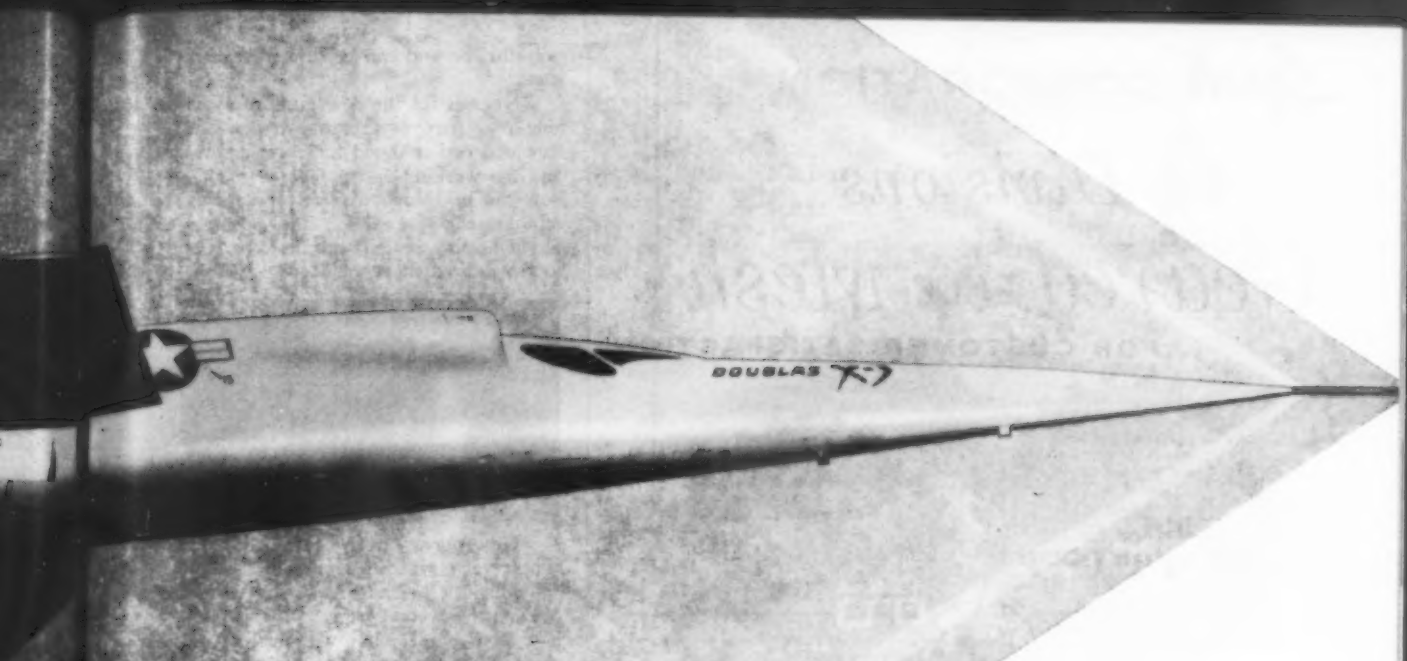
"Good will" is the disposition of the pleased customer to return to the place where he has been well treated.
—U.S. Supreme Court

TOMORROW'S AIRCRAFT: *One step closer*





Westinghouse Turbojets explore extreme speeds and altitudes ...in X-3 research jet

Pushing further into the realm of supersonic flight, twin J34 turbojets with afterburners are pioneering the use of jet power plants for sustained, high-speed flight.

J34 axial-flow turbojets were chosen to power the X-3 because of important features such as small engine diameter and high thrust-to-weight ratios which permitted the use of two engines to provide excellent high-speed performance combined with multi-engine reliability.

Westinghouse experience and technology are directed at the successful conquest of aviation frontiers. Continuing advancements merit your attention no matter what the aerodynamic design or weapons systems application might be. Let Westinghouse help you bring tomorrow's aircraft . . . One Step Closer. Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pa. J-91018

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polyethelene and can be discarded after use.

Nozzles for the new gun are available in a variety of sizes and shapes. The threaded end is fluted for easy removal and the working end is tapered so that flow can be increased merely by slicing off the end to enlarge the opening. Slight heating permits nozzle to be bent to any desired shape.

Gun operation is controlled by a simple valve which extrudes the sealant smoothly on to the area being sealed. When the valve trigger is released, flow stops immediately without blowing dust on the work or operator. A pneumatically operated unit, the gun is used with a lightweight air hose passing through its handle. A 360° swivel permits unobstructed operation.

For more information circle No. 2 on Reader Service Card, page 93.

TCA Engine Analyzers

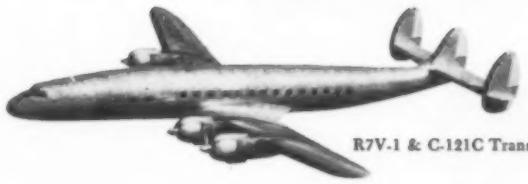
Trans-Canada Airlines has taken delivery of eight Sperry engine analyzers to be installed as airborne units in its fleet of Lockheed Super Constellations. Under TCA's training program for use of the analyzer, all Constellation pilots will be given a four-hour familiarization course on its operation, in addition to the usual training of flight engineers and mechanics.

New look in shop attire for jet engine overhaul is depicted here by a seed-blast operator at General Electric Co.'s Evendale plant cleaning the compressor section of a G-E J47 engine during routine overhaul. Protective suit includes an "airconditioned" helmet into which air is sprayed downward from the top to keep operator comfortable.

Lockheed's Super Constellation Family...

WV-1 & RC-121C Radar Search Plane

Super Constellation



R7V-1 & C-121C Transport

how it builds better futures for engineers

Five Super Constellation types are flying today—as luxury airliners, cargo transports and radar search planes. The careers of engineers associated with the Super Constellation's development have grown steadily since the project started fifteen years ago.

Production orders extend into 1956. And in development: turbo-prop Super Constellations and jet transports to continue Lockheed leadership in rapidly expanding passenger and cargo transport fields.

To the career-conscious engineer this means:

More security—for the Super Constellation's wide use in commercial fields gives Lockheed a stable development and production base which is unaffected by international events.

More opportunity for promotion and achievement —for the growing number of Super Constellation projects (along with Lockheed's diversified efforts in nuclear energy, supersonic fighters, trainers and bombers) gives engineers more scope for their ability, more opportunity for creative engineering.

Lockheed offers engineers: increased pay rates now in effect; generous travel and moving allowances; an opportunity to enjoy Southern California life; and an extremely wide range of employee benefits which add approximately 14% to your salary in the form of insurance, retirement pension, sick leave with pay, etc.

Training Program for Engineers

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in electrical, hydraulic, mechanical and structural fields.

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to evaluate airplane and engine performance from flight test data. The position requires a degree in Mechanical or Aeronautical Engineering.

Flight Test Instrumentation Engineers
for the development and application of special instrumentation in analyzing autopilots, acoustics and vibration. The position requires a degree in Electrical Engineering or Physics.

Mathematical Analysts
to work on Lockheed's two digital 701 computers. Requirements: B.S. or M.S. in Mathematics or Physics.

Structures and Stress Engineers
to perform work in structural analysis, basic loads and stress methods.

Structures Research Engineers
for Lockheed's Research Laboratory.

Thermodynamics Engineers

Weight Engineers

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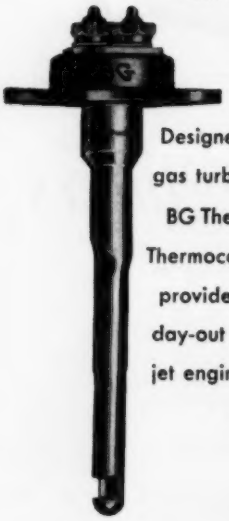

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New Products

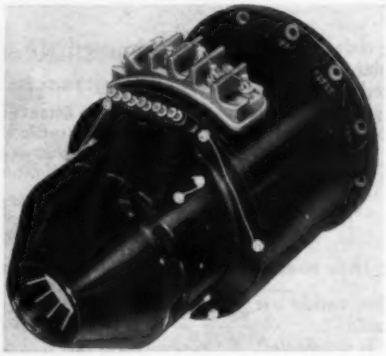
Jack & Heintz Produces New Small Generator

A new 40 kva, 3-phase, 400-cycle a-c generator, claimed to be the smallest and lightest unit for its output yet developed, is being produced by Jack & Heintz, Inc. of Cleveland, O.

The new generator measures about 10¼" in diameter and 16" overall. It weighs 86 pounds, better than 10% below that specified for 40-kva units. Among its other features are:

- Operation at much higher air-in temperatures than called for in Spec. MIL-G-6099, promising higher altitude performance.
- Brush life more than double that specified.
- Ability to carry over 75% electrical load at sea level with no blast air supplied.

Main design attraction in the new generator, according to J-H, is a fan-



shroud cooling device. This is basically a mixed-flow fan housed in a specially designed shroud which removes the water from blast cooling air. With this water separation feature, the generator is said to handle three pounds of water per minute flowing entrained in the air.

Extensive testing of the 40-kva generator by Jack & Heintz has shown these performance factors:

Harmonic Content—Excellent wave form. Under all load conditions, maximum harmonic content is less than 1.5%, whereas 5% is allowable.

Transient Voltage—With removal of 300% short circuit at 6100 rpm, open circuit voltage transient reaches a maximum of 160% of rated. Specifications allow 180%.

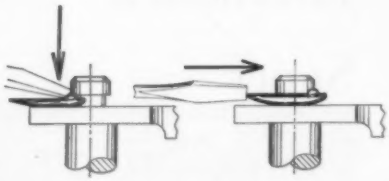
Unbalanced Loads—Under load current tests, the J-H generator shows 2.5% unbalance compared with the permissible 4%.

For more information circle No. 3 on Reader Service Card, page 93.

Lock Ring

A new retaining ring for positive locking of parts under high thrust loads is designed for use in place of expensive nuts, bolts, springs, washers, and other fasteners, according to its producer, Waldes-Kohinoor, Inc. of Long Island City, N. Y.

Called the Waldes Truarc 5139 retaining ring, the new fastener is fabricated from spring steel and shaped like a bowed horseshoe. It is manufactured to accommodate shafts ranging



from ⅛" to ½" diameter with larger sizes available for special applications.

Installation and removal can be accomplished with an ordinary screwdriver. Shear strength ranges from 500 pounds for the ⅛" ring to 2500 pounds for the ½" size.

For more information circle No. 4 on Reader Service Card, page 93.

Liquid Level Switch

For aircraft fuel system management, Avien, of Woodside, N. Y., has introduced its new Thervel liquid level switch which operates independently of fuel gaging systems, weighs less than one pound, and actuates in less than a second's time.

For aircraft refueling, tank switching, load balancing, and other fuel transfer operations, the new switch provides a direct control of fuel valves and pumps without intermediate relays or other devices. It employs a bridge circuit that is activated by any standard a-c or d-c power supply and operates in a temperature range from —65° to +200°F.

For more information circle No. 5 on Reader Service Card, page 93.

Safety Belt

Now being produced in the U. S. and marketed by Associated Technical Sales Co. of Dayton, O., the Harley Model 24200 passenger seat-belt weighs ⅞ pound and exceeds the 3000-pound minimum load rating specified by CAA in TSO-C-22B.

Main feature of the Harley belt is

instant operation under all conditions simply by rotation of a release knob located on the belt buckle mechanism. It uses a new principle in nylon webbing adjustment whereby positive tension can be achieved with no slippage. To shorten the belt, pressure is applied to a webbing pull-tab, whereas lengthening is accomplished by lifting a webbing release bar.

For more information circle No. 6 on Reader Service Card, page 93.

nose for trouble

The big black nose of the CF-100—and what's inside it—is truly a mark of distinction. For it identifies the all-weather interceptor from the day fighter and, in the case of the CF-100, as Canada's Aerial Defender against bomber attack across the North.

The "insides"—a complex mass of radar and electronic equipment—is designed to guide the CF-100 Mk. 4 unerringly to its target, lock on and destroy it with a formidable armament combination of rockets and guns. The effectiveness of this search and fire-control system is being demonstrated almost nightly during mock interception exercises by R.C.A.F. CF-100 squadrons based at strategic points.

With its twin Orendas, also designed and produced by AVRO Canada, the CF-100 Mk. 4 has a greater range and more power than any other fighter-interceptor in service anywhere. The Orenda also powers the Canadair Sabre 5, the outstanding day fighter in service today.

For original Aeronautical design, plus efficient production, look to AVRO Canada.

AIRCRAFT DIVISION

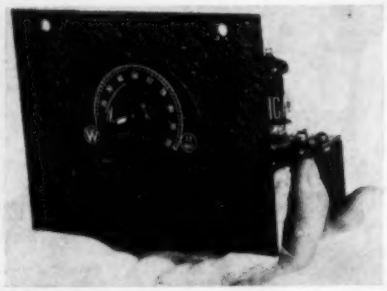
A.V. ROE CANADA LIMITED

MALTON, ONTARIO

MEMBER OF THE HAWKER SIDDELEY GROUP

Interval Timer

A new electronic interval timer produced by G. C. Wilson & Co. of Huntington, W. Va., requires only 0.1 watt for operation and is designed for accurate timing of intervals ranging from 0.05 to 7 seconds. Duration of the interval is



continuously adjustable, and use of two filament-less cold cathode tubes eliminates warm-up time.

Output of the electronic circuit is fed into a single-pole, double-throw electromagnetic relay with normally open, 10-ampere contacts. Operation is adaptable to 105/125 volt, 25-400 cycle a-c power sources.

For more information circle No. 7 on Reader Service Card, page 93.

UHF Transverter

Aircraft Radio Corporation, of Boonton, N. J., has announced development of a Type TV-10 UHF transmitter converter to extend the frequency range of its Type 12 VHF communications

equipment to the 228-258 mc UHF band.

A compact 8-channel, crystal-controlled, UHF transmitter and receiver converter, it may be added to present Type 12 VHF installations without modification of receivers or transmitters. Unit weight is 5.9 pounds including shockproof mounting.

For more information circle No. 8 on Reader Service Card, page 93.

Power Transistor

Westinghouse Electronic Tube Division has annnounced pilot production of a new power transistor that combines special mounting features and physical design to produce a unit with a one-watt rating. A black, ribbed surface provides cooling capacity for the one-watt collector dissipation rating and additional cooling is attained by fastening the semi-conductor in thermal contact with its chassis.

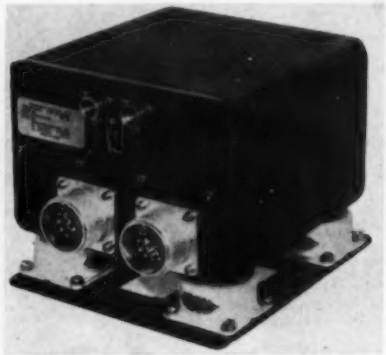
A p-n-p-type transistor, designated model 2N71, the new unit will be applicable to such low-frequency circuitry as Class A amplifiers where output power is desired.

For more information circle No. 9 on Reader Service Card, page 93.

Mach No. Computer

The CA-500 mach number computer now in production by Servomechanism, Inc. is a force-balance type design using no vacuum tubes and conforming to all pertinent Air Force specifications.

Weighing only 4.5 lbs. and said to provide accuracy within 0.01 Mach for 95% of laboratory test points, the CA-500 measures 5½" x 5½" x 4". When combined with a temperature bulb and two local wind-detectors mounted in the airstream to furnish angle of attack



and yaw information, the CA-500 produces voltages proportional to true angle of attack, angle of yaw, Mach number, and true airspeed.

Operation of the 400-cycle unit involves solution of the Mach number equation by use of a force-balance linkage which mechanically compares differential and static pressures. The resulting forces energize a servo loop which balances the computer and provides an output voltage or synchro-shaft displacement proportional to Mach number.

For more information circle No. 10 on Reader Service Card, page 93.

Flush Latches

Announced by Hartwell Aviation Co. of Los Angeles, Calif., new flush latches are designed specifically for aircraft power packs and engine nacelles and are available in straight, concave, convex, or other special skin contour

types. Weights vary from 717 to 10.6 ounces according to model.

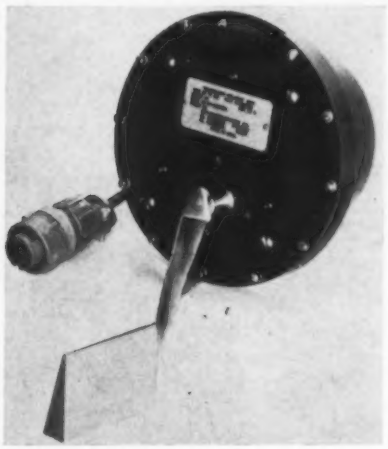
The new latches are identified as part numbers H4, H5, and H6 and feature positive latching action, simplicity of installation, and ease of operation. The design allows the latch handle to rise automatically to a position where the operator can exert normal hand pressure to open the toggle mechanism when the stud fastener is released.

One operation advantage cited is a toggle action which allows pre-load to be applied by the operator. The hook travel from unlatched to latched position provides one-inch take-up, permitting ideal maintenance of any desired pre-load.

For more information circle No. 11 on Reader Service Card, page 93.

Transducer

A new self-powered relative wind transducer developed by Servomechanisms, Inc., of Garden City, N. Y., is designed to indicate local angle of attack or yaw of an aircraft. It weighs only 1.5 pounds including cable and connector, and is said to meet all design, construction, and environmental



requirements of pertinent MIL specifications.

Identified as the Model TR-500, the new transducer derives its power from air forces acting on its protruding vane, producing an electrical output proportional to the angle it measures. The output may be displayed directly on a visual indicator or used as a signal source for computers or flight analyzers.

For more information circle No. 12 on Reader Service Card, page 93.

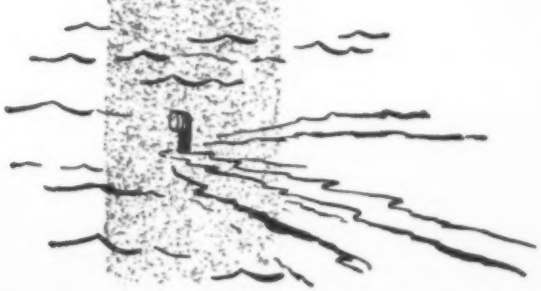
Alternator Drive

New lightweight constant-speed alternator drive for a-c aircraft electrical systems has been unveiled by the General Electric Co. Using a ball piston hydraulic design instead of the conventional cylindrical piston arrangement, the new G-E unit basically serves as a variable ratio gear box which continuously and automatically adjusts varying engine speeds to a constant speed needed to drive a-c generators.

For more information circle No. 13 on Reader Service Card, page 93.

Marquette WINDSHIELD WIPERS

...increase the effectiveness of Grumman's S2F-1 Sub Killer



The Marquette METAL PRODUCTS CO.
CLEVELAND 10, OHIO
SUBSIDIARY OF CURTISS-WRIGHT CORPORATION

Also Manufacturers of:
ROLLER BEARING TEXTILE SPINDLES
FUEL OIL PUMPS AND INJECTORS
ROTARY HIGH PRESSURE OIL FIELD PUMPING MACHINERY

INTERNATIONAL AVIATION

Edited by Anthony Vandyk

INTERCOM

COMET recertification is perhaps the No. 1 problem of the British Air Registration Board at this time.

Clues as to the certification authority's thinking on the matter are to be found in the ARB's annual report which reveals that the following five items are considered prime subjects of investigation:

(1) The problem of the introduction of a realistic form of simulated feel in powered control.

(2) The incidence of fatigue in high tensile aluminum alloys used in aircraft primary structures.

(3) The possible need to stop pure jet engines in flight in order to reduce fire risk in a defective engine and to prevent engine break-up.

(4) The need for a suitable form of fuel heating to prevent the icing of fuel systems at high altitude with consequent loss of engine power.

(5) The introduction of non-inflammable hydraulic fluid systems to eliminate one of the present fire hazards.

Meanwhile British acoustical engineers have been studying the effect of jet engine sound waves, and the associated shock waves, upon adjacent structure. Ultra-sonic and very high frequency sound waves can cause damage by exciting sympathetic vibrations, while very low frequency ones—almost below the audible range, pulsate and might conceivably promote panting in the skin.

Measurements on the testbed have shown that the exhaust of an Avon RA7 running at full power has a sound energy equivalent to 30 hp. A 15,000-lb.-thrust engine would have over 100 hp in jet noise.

The noise source of a turbojet efflux occurs aft of the nozzle, from one to 10 diameters downstream, depending on many factors (such as frequency, jet speed, and thrust). In the 150-600 cycles/second band (which are fairly deep sounds with vibration) it is six to eight diameters aft—say 9 to 14 feet—and presents an intense radiation of sound energy. • • •

Sabena Completes Year of International Helicopter Operations

THE first year of SABENA Belgian Airlines' international passenger helicopter services proved beyond doubt the value of the rotorcraft to the scheduled airline, Jean-Marie Riche reports from Brussels.

Although the helicopter operation is basically unprofitable, the tremendous publicity which it has given to SABENA is worth millions of dollars. Moreover, 3800 of the 13,000 passengers on the scheduled helicopter flights in the first year (through August 31) used the rotorcraft to make connection with SABENA fixed-wing aircraft flights.

Many of them would not have used the latter services if they had not been able to reach Brussels airport direct. The figure of 13,000 passengers, incidentally, represents 1% of the airline's total operations in terms of capacity ton-miles, and also is significant when compared with the 230,000 passengers carried by SABENA fixed-wing aircraft on European routes in the same period.

Mail-carrying experience

Part of the success of SABENA's passenger helicopter operations can be attributed to 3½ years of mail-carrying rotocraft flying. Using three Bell 47's, the airline logged over 8000 helicopter hours with 97.6% regularity before starting passenger-carrying flights with S-55's.

A survey of the 18,000 helicopter passengers carried by SABENA on scheduled and non-scheduled flights in the year ended August 31 showed that 56% chose the rotorcraft because it offered a quick connection between cities. It also revealed that 15% of the helicopter passengers had never flown before.

14,000 take-offs and landings

In the first year of operation, SABENA's four Sikorsky S-55's made about 14,000 take-offs and landings (an average of 40 movements daily) and covered some 530,000 miles. The helicopters operate twice or thrice daily between Brussels and the following cities: Antwerp and Liege (Belgium); Lille (France); Rotterdam and Maastricht (Holland); Cologne and Bonn (Germany).

Regularity in the first year averaged 83%. The low point was in December (61%) and the high point (93%) was in recent months. On-time departures were recorded for 72% of all schedules. These figures are particularly remarkable since SABENA's helicopters do not fly in instrument-weather. Moreover, last winter was particularly foggy and rainy. SABENA's safety record with helicopters has been 100%.

Looking to the future, SABENA is eagerly awaiting the availability of the twin-engine Sikorsky S-56. Starting in 1960 it hopes that helicopters will be available capable of carrying 40 to 50 passengers, operating economically on routes of 250 to 300 miles, and flying at 150 mph. Only when these rotorcraft are available will SABENA's pioneering work fully pay off. • • •

SABENA'S HELICOPTER SCOREBOARD

Month	Flights	Passengers	Total Flights Scheduled and Non-scheduled	Utilization (hours) Total Per Helicopter Monthly	Daily
1953/September	320	1,610	406	203	6.45
October	198	928	299	150	4.48
November	174	556	253	84	4.09
December	159	422	232	77	2.29
1954/January	216	444	352	88	3.23
February	171	425	330	83	2.57
March	344	752	592	148	4.46
April	362	1,350	723	181	5.45
May	390	1,529	775	194	6.16
June	374	1,498	671	168	5.36
July	398	1,584	720	180	5.48
August	394	1,560	710	178	5.44
TOTAL	3,500	12,658	6,063		
(Charters and Familiarization Flights)		5,522			
TOTAL		18,180			

IMPORTANT NEWS

from the Champion Spark Plug Company

for

AIRLINE AND EXECUTIVE AIRCRAFT OPERATORS

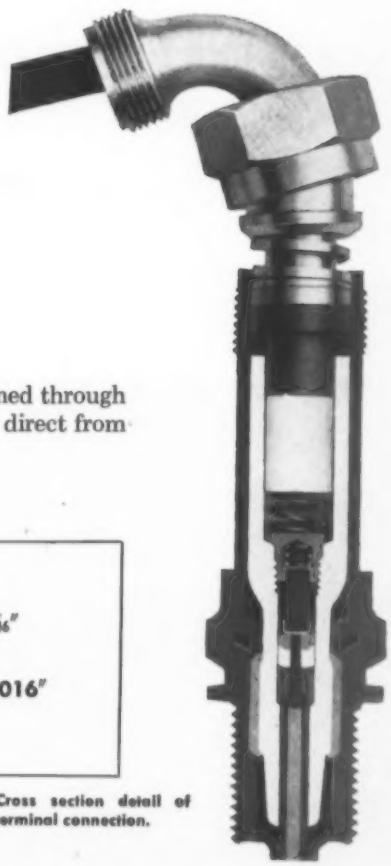
R115

Now you can have the important advantages of Champion R115 All-Weather Spark Plugs which have been available only to the Air Forces, Navy and major airlines.

The R115 now is CAA approved in the following engines: Pratt and Whitney R 1830, R 2000, R 2800, and in Wright R 1820, R 2600 and R 3350.

Three years' military and scheduled airline experience prove beyond question that Champion R115 All-Weather Spark Plugs provide uninterrupted insulation from ignition lead to spark plug, eliminating any flashover caused by moisture or high altitude or both.

Conversion is easy from the standard ⅝"-24 shielding thread types. Most cases require only the replacement of elbows and lead connectors.



Cross section detail of terminal connection.

Champion R115 All-Weather Spark Plugs may now be obtained through your regular Champion Aviation distributor or by ordering direct from the Champion Spark Plug Company, Toledo 1, Ohio.

SPECIFICATIONS

¾"-20 Shielding Thread	Installed Height 2 5/16"
Thread size 18mm	Integral Resistor
Thread length 13/16"	Gap setting .013"-.016"
Hex Size ⅞"	

Aerial view of nation's biggest integrated aircraft manufacturing plant in Marietta, Georgia.

ALL THESE FACILITIES

UNDER ONE ROOF MEAN GREATER PRODUCTION

ECONOMY AND EFFICIENCY!

In Marietta, Georgia, the nation's biggest integrated aircraft plant has never missed a delivery schedule.

Government Plant No. 6, operated by Lockheed Aircraft Corporation.

B-47 Multi-Jet Bombers on Marietta flight line before joining U.S. Air Force.

The minute you step inside Lockheed's Marietta, Georgia, factory, you are impressed with the overwhelming size—seemingly endless production lines integrating every conceivable facility for making all types of aircraft. This plant is particularly suited for the largest airplanes—bombers, tankers and transports.

The main assembly building covers 47 acres *under one roof*. The final assembly area alone is nearly half a mile long. In this giant structure are the newest automatic machines to form, mill and turn steel, aluminum and heavy alloys. The Onsrud Spar Mills can mill in one operation a 48-foot aluminum alloy plate weighing a full ton into an integrally-stiffened wing panel. Overhead cranes for lifting such huge units are completely radio-controlled.

This bigness saves *you* money because it means more efficient, more economical aircraft production. It provides maximum flexibility in production planning. Consequently, with minimum effort, the Marietta factory can be arranged to handle any design or any type of aircraft, guaranteeing a continuous flow of material from the raw state to the completed airplane. Today, more than 45,000 different parts are being manufactured at Marietta.

That's why the U.S. Air Force selected the Marietta factory to build multi-engined B-47 Jet Bombers and C-130 Turbo-Prop Combat Cargo Planes. In the more than three years under Lockheed management, this Marietta plant has never missed a delivery schedule. And today, new cost and performance records are winning additional commendations from the USAF.

Look to

LOCKHEED

for Leadership

LOCKHEED AIRCRAFT CORPORATION
MARIETTA, GEORGIA, AND BURBANK, CALIFORNIA

INTERNATIONAL AVIATION

MANUFACTURING

BRITAIN: Folland Aircraft Ltd., of Hamble, Hants, has designed a light transport, the Utility Freighter, featuring a high-wing, box-car-type fuselage with twin tail booms and fixed landing gear. Powerplant would be four DH Gypsy Queen aircooled inline engines. The square fuselage will take two jeeps through the rear door. Using high-lift flaps, the Utility Freighter will be able to operate from a grass runway of 1500 ft. Load and performance will be between the DH 89 Dragon Rapide and the DC-3. . . . The English Electric P.1 has flown supersonically in level flight, the first British aircraft to do so. . . . Bristol reports that total running time with all Proteus turboprops is over 23,000 hours on the bed and 2500 in the air, plus tens of thousands of hours' component testing.

CANADA: Bristol-Canada will use part of its recently acquired Winnipeg plant (the MacDonald Bros. Aircraft factory) to build helicopters: The first Canadian-built Nene has started its test program at the Rolls-Royce Canadian plant.

JAPAN: Kawasaki and Fuji are working on target planes and each hopes to have a prototype ready for testing within a week or two. . . . Kawasaki KA-E engine has started test runs. It will be used to power Japanese-built Bell 47 helicopters.

INDIA: Production of Rolls-Royce engines at a plant in Bangalore is contemplated by the Indian government.

AIRLINES

CANADA: Trans-Canada Air Lines has ordered seven more Vickers Viscounts, three for delivery in March 1956, four in March 1957 (first part of the re-order is firm while a letter of intent has been given for four). Delivery on TCA's original order for 15 Viscounts will start in the last week of October and scheduled services will be inaugurated on February 1. First turboprop operations to the U.S. will be started a month later over the Toronto-New York route, while on April 1 Viscount services will be extended to the Montreal-New York and Montreal-Chicago routes. On May 1 Viscounts will start flying between Montreal and Cleveland.

SOUTH AFRICA: South African Airways has ordered three Douglas DC-7B's for delivery early in 1956. The order, including spares, is worth $9 million.

JAPAN: Japan Pacific Air Lines plans to start service between Tokyo and South America using a DC-4 chartered from California Eastern Airways. Migrants will be carried at fares substantially below the IATA level. JPAL is backed by the OSK shipping company. . . . Nippon Helicopter and Aircraft Transport Co. is using a DH Heron leased from Japan Air Lines to operate its new Tokyo-Misawa-Sapporo route.

BRITAIN: Airwork Ltd., independent operator, has ordered three Viscounts 700D's for delivery in the first half of 1956. . . . Hunting-Clan Air Transport is planning to introduce an installment payment scheme under which passengers may pay before or after their trip. . . . Britavia, parent company of Aquila and Silver City Airways, has started operations under its own name using six ex-BOAC Hermes. It is flying military contract operations over the London-Nairobi (East Africa) and London-Cyprus routes. The trooping contract to the Suez Canal Zone previously held by Skyways has now been split between two other independents, Scottish Aviation and Air Charter.

GREECE: Legislation has been passed in the Greek parliament for the liquidation of TAE National Greek Airlines, a carrier in which TWA has an interest. The Greek government is reported to be setting up a new company known as Greek Airways to take over TAE's operations and assets.

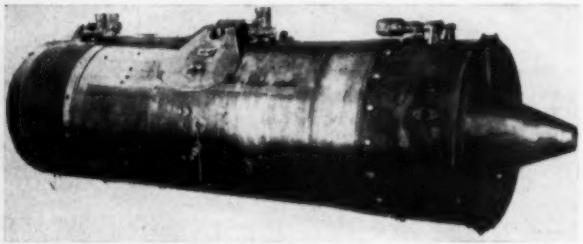
FRANCE: Air France reports a deficit of $4.8 million for 1953. The French flag carrier has ordered another six Super Constellations, bringing its total Super Connie orders to 18 aircraft. . . . UAT-Aeromaritime will operate nine flights weekly from France to Africa effective September 27, using four DC-6B's and one DC-4. . . . Both Air France and UAT-Aeromaritime have stopped paying installments on the Comet II's they have on order.

MILITARY

CANADA: RCAF recruiters are having difficulty in finding enough aircrews to meet enlistment targets. Three thousand more men are needed to reach the desired RCAF strength of 50,000

SOUTH AFRICA: The South African Air Force is seeking to purchase a large number of helicopters for air-sea-rescue. At the moment it has only one rotorcraft, an S-51.

JAPAN: Last month the Japanese naval air arm took over from the U.S. Navy five SNJ trainers. Other planes to be handed over to the Japanese by the U.S. Navy include seven more SNJ's, 17 PV2's, two PBY's, and 10 TBM's.

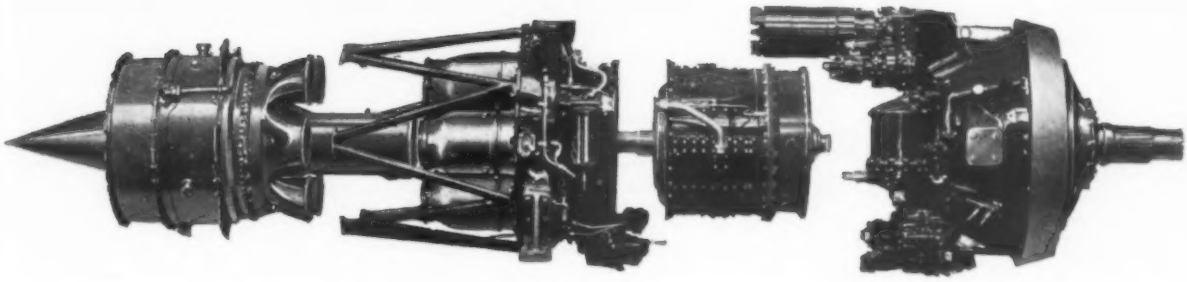


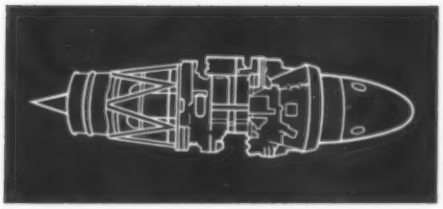
Rolls-Royce Soar

With a remarkable power/weight ratio of nearly seven pounds-thrust to one pound-weight, the Rolls-Royce Soar axial jet is believed to be intended for powering missiles or expendable fighters. Rated thrust is 1810 lbs. (it has been type-tested at 1860 lbs.) Weight is 267 lbs., length 62¾ inches, diameter 15¾ inches.

Morane Saulnier MS 760

The Morane Saulnier MS 760, four-place French jet, is a development of the Fleuret trainer. The plane is now undergoing its flight test program.





power in 4 packages

One of the big features of the Napier Eland turbo-prop is easy maintenance. Eland power comes in four packages, each of which can be removed quickly and simply. They are (1) *the reduction gear assembly* (2) *the compressor assembly* (3) *the main support plate and combustion chamber assembly, and* (4) *the turbine unit. You can take out and work on any of these sections without stripping the whole engine down. This means* fast, economical servicing.

CHECK THESE OTHER IMPORTANT ELAND FEATURES!

- High aerodynamic efficiency—3,000 e.h.p. in a cowled diameter of 36 inches.
- Low weight—0.52 lbs./e.h.p. at take-off.
- Low fuel consumption—0.452 lb./b.h.p./hr. at 35,000 ft. 400 knots cruising.
- No overheating—mercury vapour variable datum controller.
- No surge—in the event of mechanical failure between engine and gearbox the overspeed governor continues to be driven by the engine, thus preventing any overspeeding. The oil system pumps (driven by the propeller) continue to supply oil to operate the auto-pitch coarsening.

NAPIER Eland turbo-prop

Partners in progress with The English Electric Company Ltd.

D. NAPIER AND SON LIMITED · LONDON W.3 · ENGLAND

CRC 86

PIONEER

EN ROUTE . . .

WAYNE W. PARRISH

A religious celebration takes over a city

TWO things drew me to Spain last April. One was *Semana Santa*, or Holy Week. The other was the famous *feria*, or fiesta, in Seville which I'll tell you about next issue.

Holy Week in Spain has to be seen to be believed. It attracts the faithful from many parts of the world, but especially from Latin America. The entire country goes into mourning. Flags are at halfmast on government buildings. It is no time for the pleasure-seeking tourist to visit Spain, but on the other hand it is one of the most impressive celebrations that you will see anywhere on the globe.

On Palm Sunday morning my wife and I left La Coruna in northwest Spain to drive to Santiago de Compostela, a very old town in Galicia. In the crypt below the high altar of the old cathedral (begun in 1057) rest the remains of the Apostle St. James, and every July there is a big pilgrimage by the faithful to revere the relics.

We arrived at the cathedral in midmorning, expecting to see an unusually big crowd for Palm Sunday services. We were not disappointed but it turned out to be a rare experience. Everybody, including mobs of children, carried palm leaves or their equivalent. As we entered the cathedral we heard a tremendous amount of chatter. It reminded me of a high school gymnasium on the night of the championship game. It was absolute bedlam.

Bedlam in a cathedral

Kids were running around everywhere, talking and shouting. The cathedral itself was jam-packed. At first I assumed we were between services but finally I realized that there was a service in progress but that the thousands of people were paying little attention. It was a madhouse.

Finally the service ended and a procession began making its way out the south transept into the open courtyard, but there was still not much order or reverence to the occasion. Hawkers were selling everything from souvenirs to ice cream and candy. The procession made one round of the yard and returned to the cathedral and the mobs began scattering. It was the most un-religious affair I had ever seen.

We wandered around the narrow streets and byways of the old town—it was tough walking on those uneven cobblestones—and found the town's daily market in full swing, and then resumed our driving southward toward Vigo, somewhat amazed at the start of Holy Week in Spain.

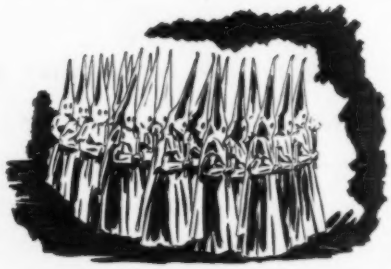
Late Wednesday afternoon we arrived in Madrid and the only open evidences of Holy Week we had seen were the altars in churches and cathedrals covered with black or purple drapes and the preparations being made for processions.

Holy Thursday was different. Madrid was transformed. Tens of thousands of women in black dresses were wearing mantillas, many with high tortoise shell combs, and some wore flowers in their hair or on their dress lapels. This is the day when the faithful visit as many churches as they can, and in Spain seven is considered the right number. There were long lines in front of every church. Traffic was blocked off in many areas. Most stores were closed. All flags were at halfmast.

The real period of mourning had begun and it was clear that all Madrid was participating. Mantillas, we learned, are worn principally on Holy Thursday, and some of them were indeed beautiful.

Procession of Silence

Next day, Good Friday, the lines at the churches continued. There were processions in various parts of town and these processions are called *pasos* and are of Byzantine origin. They are the peoples' celebration, not the church's, and are organized by the



religious brotherhoods of the various churches.

But the big event was the Procession of Silence at midnight through the main streets of Madrid. It was an unforgettable spectacle. We managed to get a table in a restaurant on the second floor overlooking the Gran Via, the main business street. All traffic was stopped for blocks in all directions. Crowds lined the streets four to ten deep for hours before midnight. The atmosphere was somber. After midnight the procession came into view and continued for over an hour.

First came horsemen with helmets and plumes, followed by drum and bugle corps (there were at least seven drum and trumpet outfits) sounding slow, solemn notes. Then came the processioners in tunics and hooded dominoes and masks, each carrying a candle or torch. Then came the bearers carrying groups of sacred figures on platforms surrounded by hundreds of candles and banks of flowers. The large sacred figures were clothed in velvet and embroidered and embellished with precious stones and jewels.

Weird demonstration

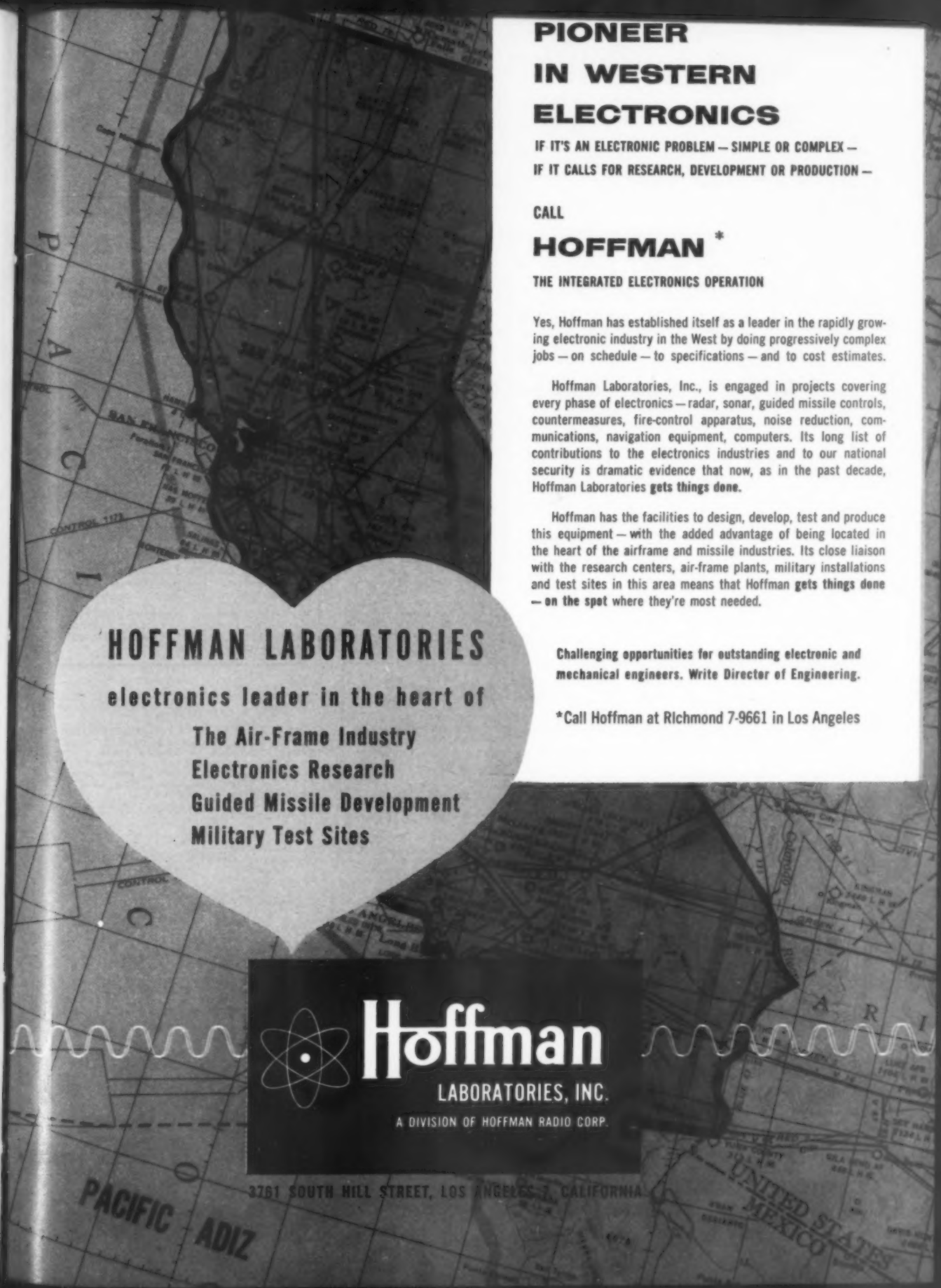
The shuffling of the slow-marching feet, the dense silent crowds lining the street, the candles and street lights providing the only light, the barefooted marchers carrying heavy crosses for penance, the barefooted women in black, the pointed hoods of scarlet, purple, and white, and the death-march beat of the drums, and the strident notes from the trumpets—it was a weird but impressive demonstration of religious devotion in this big city of Madrid after midnight on Good Friday.

To the casual visitor, this vast procession watched by hundreds of thousands in the early morning hours must have seemed almost pagan. The tall, pointed hoods, masks, and tunics worn by thousands of marchers seemed unreal. Yet all of this is a centuries-old part of Spanish religion devotion. If it seemed unreal it was because our civilization of steel and stone and electricity has become so blasé. But steel and stone or not—in Spain, Holy Week takes over and everything else comes to a halt.

A layman's affair

Two features of this procession of silence stood out in my mind. One was that the entire city of 1,700,000 was awake long after midnight. The other was that although a few of the clergy were in the procession, there were no dignitaries of the heirarchy participating. It was strictly a lay affair.

The most extensive Holy Week celebration is in Seville and attracts people from around the world. Every city in Spain has some sort of observance, but what attracted me to Madrid's was the fact that here is a metropolitan, cosmopolitan city, a major capital of the world, in which a religious celebration took over completely. • • •



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"O" RINGS. Booklet dealing with vented and standard "O" Rings and various industrial applications for static sealing of high and low pressures and temperatures. United Aircraft Products, Inc.
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AIRCRAFT ACCESSORIES. Bulletin 5403, issued by the S. S. White Industrial Div., deals with a line of aircraft accessories for use with flexible shafts. Engineering drawings, dimensions, and operating characteristics of mechanical screw jacks, pressure bulkhead fittings, and flexible adapters.
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FILTERS. New bulk filtration catalog on micronic filters designed for the aviation and petroleum industries. Purolator Products, Inc. Complete with illustrations, performance charts, and engineering specifications.
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AIRCRAFT CABLE. Aircraft Div., of the Bergen Wire Rope Co. Reference folder on aircraft cable performance with recommended Airite types for various applications and description of its new hydroformer rotary swaging method for terminals and assemblies.
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TEST INSTRUMENTS. Describes recording oscillographs, galvanometers, instrument amplifiers, and bridge balances, analog computers, function generators, and related instruments manufactured by Miller Instruments, Inc.
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HYDRAULIC PUMPS. Bulletin describes Model S-216-C series of air-driven, high-pressure hydraulic pumps offered by Sprague Engineering & Sales Corp. Eight models with discharge pressures from 1100 to 33,500 psi are listed.
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DYNAMOMETER SYSTEMS. Revised bulletin on dynamometer systems. General Electric Co.
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MOUNTING SYSTEMS. Developments in vibration and shock control mounting systems. Semi-monthly bulletins by Robinson Aviation, Inc.
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HYDRAULIC PUMPS. Watertown Division, New York Air Brake Co. Brochure on its 66W series variable delivery hydraulic air craft pumps for 3000 psi operation.
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PRECISION CASTING. Circular titled "Precision Casting Facilities," by Airtron, Inc., shows visually various steps taken in casting microwave and radar components.
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STABILIZATION SYSTEM. Minneapolis-Honeywell Aeronautical Division. Brochure on its stabilization system for transonic and supersonic aircraft which provides the pilot with pitch, roll, and yaw stabilization, as well as automatic coordination during flight maneuvers.
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AIRCRAFT LOCK NUTS. New catalog on different types of aircraft lock nuts available through Boots Aircraft.
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THREAD REPAIR. Prepared for mechanics, Bulletin No. 654 shows how stripped or worn threads can be repaired. Heli-Coil Corp.
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SURFACE GRINDING. "Techniques of Surface Grinding" is a 31-minute, 16 mm sound film in color produced by The Doll Co., to show operating methods and design factors affecting good results in surface grinding.
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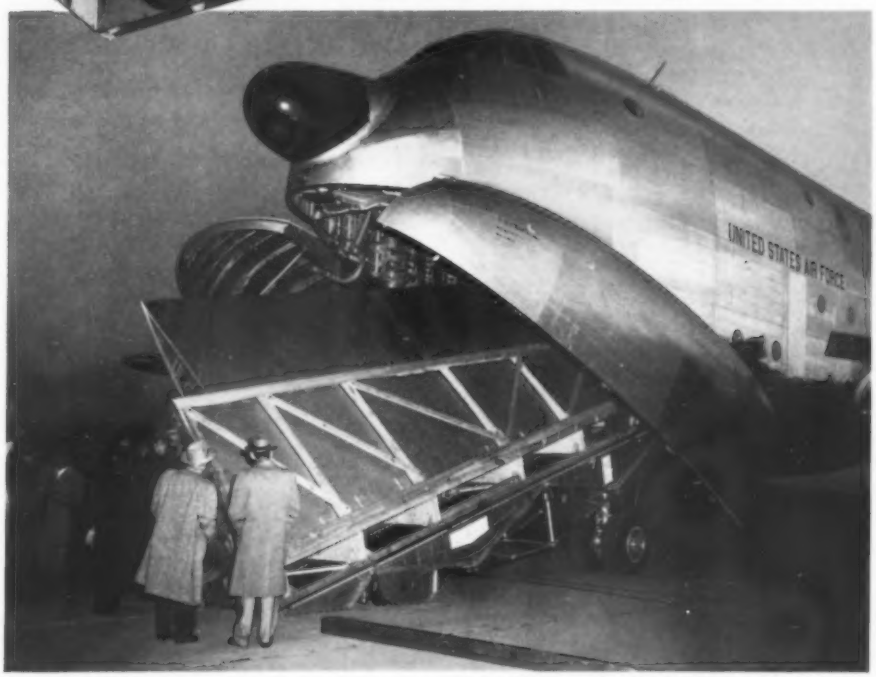

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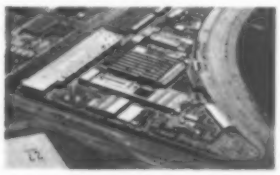

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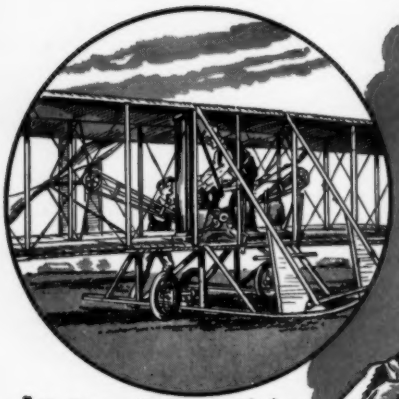
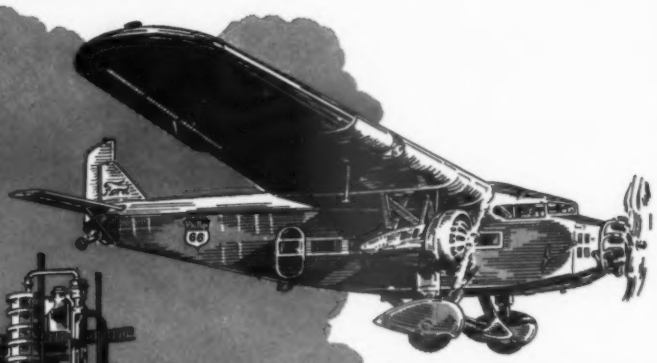
MILESTONES IN AVIATION

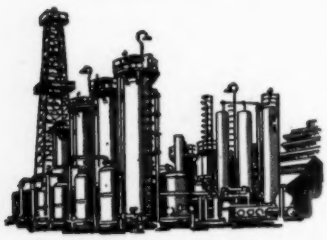
How Phillips 66 Pioneered in High Test Aviation Fuel



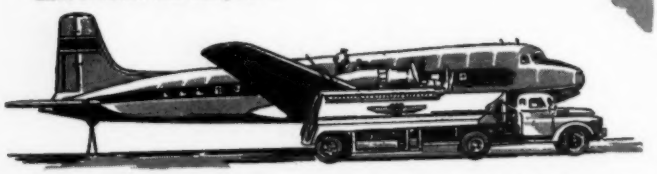
1 Until the early Twenties, airplane engines were often started in cold weather by using ether in a priming cup built into the intake manifold. Engines sputtered until they became hot enough to vaporize regular gasoline.



2 Then Phillips Petroleum Company scientists blended liquids from natural gas into aviation fuel—a process which resulted in faster engine warm-up, easier, quicker starts, smoother operation. The powerful, highly volatile elements of natural gasoline improved the performance of aviation engines.



3 In 1942, Phillips put in operation the very first HF alkylation plant—for the production of HF Alkylate, a high-power, high-performance aviation fuel component.



4 Today, Phillips produces tremendous quantities of 115/145 grade aviation gasoline for commercial and military use.

Phillips Petroleum Company has always taken a special interest in aviation. Phillips research programs have always laid special emphasis on aviation needs, and Phillips took an active part in the early, crucial setting up of standards for aviation fuels and lubricants. Phillips research and manufacturing have led the way in the production of many of the major ingredients of aviation gasolines.

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